

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 28-01-2011		2. REPORT TYPE FINAL		3. DATES COVERED (From - To)
4. TITLE AND SUBTITLE GLOBAL SHIPPING GAME		5a. CONTRACT NUMBER		
		5b. GRANT NUMBER		
		5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Prof. Doug Ducharme, Dr. Hank Brightman		5d. PROJECT NUMBER		
		5e. TASK NUMBER		
		5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) War Gaming Department Naval War College 686 Cushing Road Newport, RI 02841-1207		8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)		
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement A: Approved for public release; Distribution is unlimited.				
13. SUPPLEMENTARY NOTES These game findings reflect the observations, insights and recommendations that were derived from participants during game play.				
14. ABSTRACT The Global Shipping Game was designed to inform Navy leadership on the strategic level implications of future changes in shipping patterns as a result of the expansion of the Panama Canal and the opening of the Arctic. Players were a diverse group of experts from government, industry, and academia. Industry representatives were especially concerned about changes in the level of predictability that will result from shifting patterns of trade following expansion of the Panama Canal. Arctic experts believed that the amount of U.S. effort to operate in the Arctic will depend on the level of economic viability that could result from extraction of resources. Players widely agreed that U.S. ratification of UNCLOS is necessary in order to protect future economic and national interests. This game report provides guidance for national leadership pertaining to potential investment for building relationships, attaining and securing information, and developing capabilities to ensure efficacy in global maritime shipping.				
15. SUBJECT TERMS Shipping, Trade, Supply Chain, Panama Canal, Arctic, International Law, UNCLOS, Cyber Security, War Game				
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 87	19a. NAME OF RESPONSIBLE PERSON Chairman, War Gaming Department
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED			c. THIS PAGE UNCLASSIFIED



GLOBAL SHIPPING GAME

GAME REPORT



8-9 December 2010

**U.S. Naval War College
Newport, Rhode Island**

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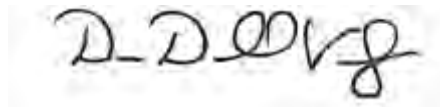
Lead Analyst: Dr. Hank Brightman

January 28, 2011

The War Gaming Department of the U.S. Naval War College hosted the Global Shipping Game on 8-9 December 2010. The following document was prepared by the War Gaming Department faculty and has been reviewed by the appropriate game sponsor staff personnel. The findings in this report reflect the observations, insights and recommendations that were derived from the participants during game play.

The War Gaming Department conducts high quality research, analysis, gaming, and education to support the Naval War College mission, prepare future maritime leaders, and help shape key decisions on the future of the Navy. The War Gaming Department strives to provide interested parties with intellectually honest analysis of complex problems using a wide range of research tools and analytical methodologies.

Game reports are developed for the game sponsor; however, the game report and related data may be available on an as-requested basis. For additional information please contact the Chairman, War Gaming Department, Naval War College, 686 Cushing Road, Newport, RI 02841 or via electronic mail at wargaming@usnwc.edu. Further information may be found on our website, located at www.usnwc.edu/wargaming.

A handwritten signature in black ink, appearing to read "D. DellaVolpe", is centered on the page.

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EXECUTIVE SUMMARY

Introduction

During the period 8-9 December 2010, the United States Naval War College (NWC) in Newport, Rhode Island hosted the Global Shipping Game (GSG). The GSG was developed and executed at the direction of the Chief of Naval Operations (CNO). The purpose of the GSG was to explore strategic-level implications as a result of future changes in global shipping patterns.

The CNO directed the NWC to develop a game that would explore changes in economic and trade patterns within the context of two future scenarios: expansion of the Panama Canal in 2020 and increased access of commercial shipping through the Arctic by 2035.

After reviewing the research literature, the GSG was honed to explore two overarching research questions based on the CNO's areas of interest:

- What are the broad, strategic security implications for the United States posed by projected changes in shipping patterns as a result of the Panama Canal expansion?
- What are the broad, strategic security implications for the United States posed by projected changes in shipping patterns as a result of the opening of the Arctic?

In addition to the two primary research questions, the GSG also examined the following two subsidiary questions:

- What, if any, are the impacts to U.S. security interests for failing to ratify the United Nations Convention on Law of the Sea (UNCLOS) Treaty based on projected changes in shipping patterns as a result of either the Panama Canal expansion or the opening of the Arctic?
- What challenges, if any, will expansion of the Panama Canal or the opening of the Arctic present to U.S. naval forces engaged in ensuring the free flow of goods at sea while maintaining forward global presence?

Participants and Game Structure

In addition to serving as a highly analytical event, the GSG was designed to enhance participants' understanding of how assumptions regarding emerging paradigms (the Panama Canal expansion and opening of the Arctic) might impact shipping patterns at the regional level and beyond. These assumptions were emphasized during the game's opening session by the Chief of Naval Operations. Participants were comprised primarily of senior level personnel with the necessary knowledge and experience to enable them to envision future changes that might likely occur in the Panama Canal (2020) and Arctic (2035) scenarios. Players were selected

based on their specialized knowledge of these regions or functional expertise related to the global supply chain. A broad range of backgrounds was desired to ensure that as many viewpoints and variables as possible were considered during the game play. More than half of the players in the Panama Canal groups came from corporate industry and provided expert perspectives from various aspects of the supply chain. The players in the Arctic groups were primarily gleaned from government and academia and provided expertise from policy and climatology perspectives concerning Arctic issues.

The 73 players received various background briefs presented from military, government, and commercial shipping industry perspectives on the expansion of the Panama Canal and the opening of the Arctic. Divided into four functional groups of approximately 18 players, the teams included a wide range of stakeholders including military representatives (U.S. Navy and Coast Guard); policy, legal, and security experts; shipping entities, including both commercial producers and carriers; and economic, financial, and insurance experts. All four groups had a diverse distribution of expertise represented in order to generate and share multiple perspectives on potential consequences of the anticipated changing environment.

Two groups focused solely on the strategic implications of the Panama Canal expansion while the other two groups focused solely on the opening of the Arctic. During move 1, the players participated in facilitated discussion or brainstorming sessions that followed an inductive approach in order to identify implications and assumptions that may not have been initially obvious by all perspectives. During move 2, a more deductive approach was followed through the use of injects presented to the players in order to challenge assumptions previously identified. Lastly, a combined plenary concluded the game by sharing player insights among all four groups.

Player-derived Themes

The post-game analysis team consisted of 20 members from the Naval War College that were trained in both data collection during the game and post-game analytic techniques. A mixed methods approach, consisting of various qualitative and quantitative techniques, was utilized for triangulation purposes in order to achieve credible and reliable findings from the data collected. Game data were coded, grouped in categories, and then analyzed for themes the analysis team.

Panama Canal Expansion

1. **Gradual Change** - While the expansion will increase the amount of cargo transiting the canal and new shipping routes will be established, the impact will be more gradual than transformative. Industry experts explain that due to market-driven factors, building of new Panamax ships and investment in facilities to handle these ships, it will take time for industry to react to these changes.

2. **Infrastructure Limitations** – Given the current supply chain, U.S. East Coast ports generally lack a combination of vessel clearance, cargo handling capabilities, and distribution capacity to support an increase in shipping and larger ships. Most ports lack sufficient depth (water draft), while some ports, such as New York, lack under bridge clearance (air draft). Other ports, such as Halifax and Norfolk, have vessel clearance but lack the rail and highway distribution capacity to get products to market. Due of these limitations and gradual change, it is anticipated that the U.S. West Coast ports and the intermodal system will continue to be relevant and cost-efficient by the year 2020.

3. **Predictability/Reliability** - This theme emerged from a consistent discussion by industry experts over concern for uncertainty, instability, and non-reliability to explain why these changes impact their interest area. There was general agreement that the expansion will make the Panama Canal more important in future global trade, thereby increasing its importance as a strategic choke point and requiring greater stability in its economic, political, and security environment.

4. **New Relationships/Partnerships** - New relationships and partnerships will emerge as a result of changes in trade patterns generated by canal expansion. Game participants expect more Northeast-Southwest and Northwest-Southeast crisscross shipping through the canal. Some of these relationships may create uncertainty and complicate the political status quo in the region, such as the unpredictable environment that may emerge as a result of future China investment in and trade with Venezuela.

5. **Cyber Security** - The players discussed the importance of cyber security in relation to global shipping and trade. The concept of e-SLOCs emerged from the analysis of player discussions. An e-SLOC is the “cyber network that supports the global maritime trade network.” Industry experts felt that disruptions to the e-SLOCs would have a more enduring effect on the entire supply chain than physical barriers. They felt that shipping can always go around and find a way to get to the market, but the cyber network is integral to the entire supply chain operation and information denial could degrade the entire system.

Arctic Opening

1. **Gradual Change** – Game participants believed that projected changes in shipping patterns will occur gradually, rather than overnight, due to the gradual nature of the climate change taking place. Increased global demand and technological advances could accelerate these changes in shipping patterns. However, preparing for these changes by industries and governments will require long lead times of a decade or more in some cases.

2. **Arctic economic viability** – Players said that understanding the extent of the economic viability of the Arctic is necessary to determine the extent of implications and activity needed in the region. The nature of this economic viability of the opening of the Arctic will be more

a result of resource extraction and thus will increase the amount of destination shipping (to and from the Arctic) rather than trade route shipping (through the Arctic).

3. U.S. Ratification of UNCLOS - The immediate U.S. ratification of the UNCLOS was strongly supported by all the players. Players said that failure to ratify UNCLOS will create substantial risk for the United States in terms of economic development in the Arctic and will threaten the U.S. position as a global leader in maritime issues.

Primary Findings

In focusing on the broad security implications posed by projected changes in shipping patterns as a result of the Panama Canal expansion and opening of the Arctic, players sought to identify implications concerning the nature of (1) relationships, (2) information, and (3) capabilities that define the future strategic environment in the context of global maritime shipping.

With respect to building (1) relationships, the players in the Panama Canal groups identified the need for cooperative security agreements among regional stakeholders in order to ensure predictability of the economic environment. Players in the Arctic groups identified the need for building Arctic partnerships in order to build Arctic Domain Awareness (ADA), with an emphasis on the vastness of the maritime passages and the need to response to crises. Participants in the Arctic cells further asserted that UNCLOS ratification would reinforce the U.S. leadership role in Arctic issues, including ADA.

Regarding the value of (2) information, in the Panama Canal expansion scenario, players identified the need for cyber security in order to support global maritime trade. Players also indicated that developing Arctic Domain Awareness was the first critical step, along with ratification of UNCLOS, in securing U.S. interests concerning economic development of the Arctic.

With respect to developing (3) capabilities, market driven investment in U.S. East Coast ports and infrastructure was identified as essential to prepare for shipping pattern changes as a result of the Panama Canal expansion. As foreign ports will be ready to receive new Panamax ships first, transshipment operations will increase and require additional regional maritime security and law enforcement operations. The opening of the Arctic will require U.S. maritime forces to operate in the region, with the Coast Guard providing presence and the Navy conducting operations in the Arctic environment as needed.

In summary, according to the impressive group of recognized experts that participated in this game, U.S. leadership should focus on relationships, information, and developing capabilities to ensure national security interests are maintained in the future given projected changes in shipping patterns. These could also be areas for further study through follow-on gaming or other research methods.

Subsidiary Findings

Players agreed that the United States should ratify UNCLOS as soon as possible. Players cited a number of reasons why UNCLOS ratification should be considered as a national imperative. First, without ratification, the United States does not have a seat at the table despite the fact that UNCLOS was originally drafted with U.S. interests in mind. Second, the United States has not yet ratified this treaty and other states that have ratified it have the ability to modify it while the United States remains dormant. If the United States ratifies UNCLOS after modification by other states, then it must be accepted as modified, with amendments that may not be favorable to the United States. Third, failure to ratify UNCLOS will mean that the United States will not be able to file for an Expanded Continental Shelf Claim in order to extract resources beyond the 200 mile Economic Exclusion Zone (EEZ). Fourth, ratification would increase the certainty or predictability of the future security and political environment that industry desires in order to invest in economic development of the Arctic region. Thus, non-ratification risks the loss of future economic interests by the United States.

Non-ratification of UNCLOS may also negatively impact other U.S. interests and other regions. Taking note of U.S. non-ratification, other states may disregard key aspects of international law, such as Freedom of Navigation (FON) or rights under the EEZ. They may feel that if the U.S. government does not recognize the rules, then why should they? The impacts of nations withdrawing from the convention or challenging it could spill over into unintended consequences elsewhere, such as conflict in the South China Sea.

The importance of U.S. ratification of UNCLOS has been stressed by international naval officers in previous war games at the Naval War College, such as the recent Global Maritime Partnership Game. The need for U.S. leadership through ratification of UNCLOS is warranted in order to prevent the erosion of U.S. influence among partners across the globe.

Conclusions

The Global Shipping Game was designed to inform the CNO on the strategic level implications of future changes in shipping patterns as a result of the expansion of the Panama Canal and the opening of the Arctic. Players were a diverse group of experts from government, industry, and academia. Industry representatives were especially concerned about changes in the level of predictability that will result from shifting patterns of trade following expansion of the Panama Canal. Arctic experts believed that the amount of U.S. effort to operate in the Arctic will depend on the level of economic viability that could result from extraction of resources.

Players widely agreed that U.S. ratification of UNCLOS is necessary in order to protect future economic and national interests. This game provides guidance for national leadership pertaining to potential investment for building relationships, attaining and securing information, and developing capabilities to ensure efficacy in global maritime shipping.

I. INTRODUCTION

a. Statement of Sponsor's Interest in this Topic

The Chief of Naval Operations (CNO) directed the Naval War College (NWC) to develop and execute a game which explored the strategic implications of future changes in global shipping patterns. This game, referred to hereinafter as the Global Shipping Game (GSG) sought to identify changes in economic and trade patterns within the context of two future scenarios: Widening of the Panama Canal in 2020 and increased access of commercial shipping through the Arctic passages by 2035. The CNO also requested that the NWC examine future impacts of U.S. ratification (or non-ratification) of the United Nations Convention on the Law of the Sea (UNCLOS). The CNO's primary interest in examining UNCLOS within this context stems from the hypothesis that the status of treaty ratification may impact U.S. strategic security interests, and these interests may also be influenced by the expansion of the Panama Canal and/or the opening of the Arctic for shipping.

Faculty assigned to the NWC's War Gaming Department (WGD) within the Center for Naval Warfare Studies (CNWS) engaged in a preliminary literature review in order to appropriately delve into the CNO's area of interest, ranging from the historical writings on the Arctic passages of Armstrong (1952) and Belov (2000), to the more contemporary works of Dewar and Wachs (2006) and Peterson, McGuirk, Houston, Horvitz, and Wehner (2008). Similar research into the collection of Panama Canal expansion studies and their impact on global shipping and U.S. interests (Bittner, 2010; Harrison, Hutson, & Prasad, 2007) was also conducted, along with a thorough review of the Naval War College library of student papers in these areas.

b. Objectives/Rationale for this Game

Based on the CNO's area of interest and informed by the scholarly literature review, the Global Shipping Game was structured to explore three objectives grounded in changes in shipping patterns as projected results of the Panama Canal expansion and the opening of the Arctic. These objectives were as follows:

1. Identify strategic implications
2. Assess the impact of ratification or non-ratification of the United Nations Convention for the Law of the Sea (UNCLOS)
3. Provide an environment for participants to appreciate the interrelated nature of factors relative to implications of shipping pattern changes

It should be noted that the first two objectives are primarily analytical in nature, whereas the third objective should be considered predominately experiential for the players who participated in the Global Shipping Game. Specifically, the third objective sought to enhance participants' understanding of how assumptions regarding emerging paradigms (i.e., the Panama Canal

expansion and opening of the Arctic) could impact shipping patterns at the regional level and beyond.

c. Overarching Research Questions

Based upon the CNO's area of interest, subsequent literature review by the Naval War College's WGD faculty, and the two primary objectives for this game, the following two overarching research questions were developed:

- What are the broad, strategic security implications for the United States posed by projected changes in shipping patterns as a result of the Panama Canal expansion?
- What are the broad, strategic security implications for the United States posed by projected changes in shipping patterns as a result of the opening of the Arctic?

d. Subsidiary Questions

In addition to the two primary research questions, the GSG also examined the following four subsidiary questions:

- Based on projected changes in shipping patterns as a result of the Panama Canal expansion, what, if any, are the impacts to U.S. Security interests for failing to ratify the United Nations Convention on Law of the Sea (UNCLOS) Treaty?
- Based on projected changes in shipping patterns as a result of the opening of the Arctic, what, if any, are the impacts to U.S. Security interests for failing to ratify the United Nations Convention on Law of the Sea (UNCLOS) Treaty?
- What challenges, if any, will expansion of the Panama Canal present to U.S. Naval forces engaged in ensuring the free flow of goods at sea while maintaining forward global presence?
- What challenges, if any, will the opening of the Arctic present to U.S. Naval forces engaged in ensuring the free flow of goods at sea while maintaining forward global presence?

e. Identification of Independent and Dependent Variables

The two independent or x variables in this game consisted of the Panama Canal Expansion ($x1$) or Opening of the Arctic ($x2$). The primary dependent (y) variables concerned the impacts on U.S. security interests. In this way, the researchers set out to explore how U.S. security interests are impacted by the Panama Canal expansion or the opening of the Arctic.

$$[y = f(x1, x2)]$$

In addition, in order to fully assess the impacts of the independent variable on the dependent variables, a series of mediator (z) variables, including changes in law and policy such as concerning UNCLOS and Jones Act (z1), catastrophic oil or hazardous substances releases (z2), enforcement of sovereignty claims on disputed waters (z3), and changes in maritime illicit activity (z4), were introduced during the second move of the game. These mediator variables were employed in order to suppress the natural inclination found in hypothesis testing to explore direct or causal relationships between the x and y variables.

f. Definition of Key Terms

United Nations Convention on the Law of the Sea (UNCLOS): An agreement concluded in 1982 and designed to replace four previous treaties, UNCLOS addresses issues involving the area of the seabed and ocean floor and the subsoil, beyond the limits of national jurisdiction, as well as its resources, and emphasizes the common heritage of mankind, and the exploration and exploitation of which shall be carried out for the benefit of mankind as a whole, irrespective of the geographical location of States. At present, the United States abides by many of the provisions of the treaty; however, it has not yet been ratified.

Jones Act: also known as the Merchant Marine Act of 1920, requires that all goods transported by water between U.S. ports are to be carried by U.S.-flag vessels, constructed in the United States, and crewed by U.S. citizens.

Political Activity (PA): Actions undertaken by members, affiliations, or parties vested with authority that possess a common set of interests, concerns, and goals.

Economic Activity (EA): The production, distribution, and consumption of goods and services to or for a given population.

Social Activity (SA): Actions designed to better understand a society's culture and its norms.

Infrastructure Activity (IA): Actions involving transportation, power generation, communications, banking, and health.

Information Systems Activity (ISA): Efforts to collect, process, store, transmit, display, disseminate, and act on information.

Military Activity (MA): The use of state-sponsored armies, navies, air forces or national militias possessing the capability to conduct both offensive and defensive operations.

II. GAME DESIGN & RESEARCH METHODOLOGY

a. Discussion of Game Design

Based upon CNO's area of interest, the Global Shipping Game was developed to explore the implications of the widening of the Panama Canal in 2020 and increased access of commercial shipping through the Arctic passages by 2035. Potential implications include changes to the United States' security calculations in the Caribbean and the impact of ratification or non-ratification of UNCLOS.

As an applied research project, the Global Shipping Game's design focused on specific events viewed through an inductive lens for the first move, and the application of deductive thinking (focused on the CNO's hypothesis concerning the ratification of UNCLOS) for the second move. Such a process is best suited when addressing strategic issues including those raised in the overarching and subsidiary research questions. Moreover, this approach afforded experts, from multiple disciplines the opportunity to describe the changes in the economic and trade patterns from their perspectives. Game play empowered participants to make assessments of various conditions impacting shipping patterns. Consistent with the two analytical objectives established for this project, the value of this methodology is that it began with an open aperture allowing the participants to explore issues from many angles, while specific insights germane to the CNO's hypothesis were explored during the second move of this game.

In order to ground the players in a shared experience, the Global Shipping Game began on December 8, 2010 with opening remarks from the Chief of Naval Operations. The CNO challenged the players to explore the complex environment associated with the Panama Canal expansion and opening of the Arctic in order to help inform the U.S. leadership and explain "what does it all mean?" The players were subsequently presented with several background briefs covering the Panama Canal expansion, opening of the Arctic, United Nations Convention on the Law of the Sea, and a commercial perspective on maritime ports and shipping.

b. Game Mechanics

Following the briefing sessions, approximately 73 players were divided into four roughly equal focus groups (or cells), with about 36 players in groups A and B exploring Panama Canal expansion issues, and 37 players in groups C and D discussing the opening of the Arctic. A summary of the players' backgrounds, including subject matter expertise, education, and years of experience is found in section III(a) of this game report.

In order to explore the scenarios from multiple perspectives, each cell consisted of an interdisciplinary array of experts including military representatives (U.S. Navy and Coast Guard); policy, legal, and security experts; shipping entities, including both commercial producers and carriers; and economic, financial, and insurance experts.

During the first move, cells A and B were presented with the scene setter planning factors of the widening of the Panama Canal by 2020, while cells C and D were given a glimpse into the

opening of the Arctic in 2035. After completing a baseline survey (see Appendix G) players engaged in a ranking activity to determine which six activities (i.e., political (PA), economic (EA), social (SA), infrastructure (IA), information systems (ISA), and military (MA)) were most significant to their industry or business given the scene setter planning factors provided. Definitions for each of these activities are found in Section I(f) of this game report. The ranking activity served as the mechanism for fostering robust, facilitated discussion within the game cells. For example, based on the aggregated priorities for the group, changes in shipping patterns and their implications on global trade were discussed. Consequently, the discourse led to evaluation of the financial and economic interests of global stakeholders. Lastly, groups discussed how these changes influence economic and security policies beyond the regional level.

At the conclusion of the facilitated discussion, participants completed a post-move survey to capture their individual thoughts and insights (see Appendix G). Each cell also supported the development of a PowerPoint presentation consisting of one or two slides, based on the rough product generated “behind-the-scenes” during player discussions by a member of the Data Collection & Analysis Team. These PowerPoint slides were used as to stimulate discussion in the facilitated plenary sessions as the groups compared and contrasted implications and assumptions identified in their respective groups.

Cells A and B (Panama Canal expansion), and cells C and D (Arctic expansion) subsequently came together for two distinct moderated plenary discussions (one for the Panama Canal and one for the Arctic). During these sessions, the scene setter and player responses were examined in totality from the perspective of the two different teams considering the issue. Following the plenary discussion and based on individual cell deliverables, a broader discussion addressed additional topics that were raised and were applicable to overall changes in shipping and trade patterns.

To conclude day one, the players attended a keynote address by Dr. Michael Vlahos who presented the “Ashen Truths” lecture where a crisis of globalization was applied to future changes in shipping and trade. During the keynote address, the control team examined the survey data, key implications presented in plenary, and critical assumptions identified by the analysis team during move one. The control team developed injects for move two that would challenge these assumptions and generate more discussion about key implications.

For the second move, groups addressed the widening of the Panama Canal by 2020 and opening of the Arctic in 2035 following a nearly identical process as the first day of game play. In essence, the primary difference between Moves 1 and 2 was the inclusion of injects. Inject examples included changes in law and policy (UNCLOS, Jones Act), catastrophic oil or hazardous substances releases, enforcement of sovereignty claims on disputed waters, and changes in maritime illicit activity, that were introduced in order to challenge assumptions regarding shipping patterns at the regional level and beyond. These injects were developed based upon player survey responses addressing potential threats to stability and predictability. Each cell then engaged in a facilitated discussion on how these injects could impact shipping patterns at the regional level and beyond. Ultimately, this process fostered deeper thinking on the subsidiary research questions posed in this game. Participants subsequently completed a post-

Move 2 survey (see Appendix V), and refined a PowerPoint presentation using a process similar to the first day of game play.

A combined plenary session included participants from all four game cells (Panama and Arctic). Additional player insights not readily discernable from the PowerPoint briefs were captured. As a framing tool for this session, players conducted a “30 second elevator speech” activity intended to inform the CNO of the key takeaways from the game. The highlights of these “elevator speeches” were presented by the groups in this combined plenary and open discussion ensued.

c. Analytic Framing

Unlike other Naval War College WGD projects during which the sponsor may be seeking information to make strategic decisions at a long-term future date, the time-horizon for providing Global Shipping Game findings to the CNO was highly truncated given his need for actionable information. Accordingly, this game employed an applied research approach, meaning that all of the data generated by the players were designed to be optimized for nearly real-time post-game analysis.

The primary analytic engines for this project were the participant surveys (comprised of Likert-based and structured narrative questions) and the group-based PowerPoint presentations generated within the groups at the close of each move. Each group had a data recorder (technographer) who was trained in using i2 Analyst Notebook software for conducting network analysis. This technographer employed i2 Analyst’s Notebook (version 8) to develop link and node charts that focused on the players’ discussions of the political, economic, social, infrastructure, information systems, and military links based on possible changes in shipping patterns posed by expansion of the Panama Canal or the opening of the Arctic for post-game analysis. The technographer listened to the facilitated discussion in the group. As topics were discussed, the technographer recorded the entities (person, place, or things) as nodes and the context of the discussion as links (relationships). Since the facilitated discussions were kept at the strategic level (political activity, social activity, economic activity, information systems activity, infrastructure activity, and military activity), the relationships were depicted in strategic terms. This analysis method provided the researchers an additional way to quickly derive the strategic level implications given the game conditions. Lastly, an ethnographer was employed in each cell, primarily for the purpose of capturing meaningful exchanges between players during the facilitated discussions in the groups, but also as the source of data capture for the three plenary sessions in this game.

Based on the highly structured nature of data capture, surveys, PowerPoint slides, behind-the-scenes link and node charts, and plenary session ethnographic notes were scrutinized in search of patterns that the data reflected.

Because the game employed a combination of qualitative grounded induction and more traditional quantitative deduction techniques (framed through the CNO’s hypothesis of UNCLOS ratification/non-ratification), the overarching methodology used in this game was triangulation. Current thinking in the field of social research suggests that a variety of analytic tools should be employed in behaviorally-based activities such as decision-making games, thus maximizing the

credibility of the work. One widely accepted mixed-methodology that takes advantage of multiple data collection techniques is triangulation. This approach allows the analysis team to derive the same or very similar conclusions using different datasets or methods. Much of the strength of triangulation stems from its ability to distinguish between the idiosyncratic, and its ability to allow researchers to base their inquiry in the assumptions being used. Moreover, as a form of applied research, the strength of triangulation rests in its flexibility which ensures that the research question posed yields the appropriate methodology, rather than the methodology driving the research question. Furthermore, the credibility and reliability of the findings are enhanced by employing two parallel groups exploring the same topics simultaneously. The probability of findings to be credible based on two groups coming to the same conclusion is greater than if only one group explored the research questions.

Consistent with this triangulative approach, the data streams collected during this game were analyzed using a variety of techniques. A brief description of each analytic tool follows used in post-game analysis is included below. The overarching triangulation approach is also depicted in the figure found in Figure 2.1 of this game report.

- **Content Analysis:** A method whereby a researcher seeks objectively to describe the content of communication messages that people have previously produced. “Content analysis involves identifying coherent and important examples and patterns in the data and subdividing data into coherent categories, patterns, and themes. For the purposes of this game, content were binned to determine which, if any, of the focus areas presented in the objectives, overarching and subsidiary research questions, and CNO’s hypothesis regarding UNCLOS ratification/non-ratification were supported by player actions, comments, or control team assessment.
- **Grounded Theory:** A more detailed, methodologically sound approach to analysis than the initial step of content analysis, grounded theory employs systematic, hierarchical procedures to develop inductively derived theory grounded in data. Grounded theory directs researchers to look for patterns in data so that they can make general statements about the issues they examined. For the purposes of the Global Shipping Game, analysts used an inductive, theory discovery methodology that allowed the researchers to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data.
- **Data Visualization:** Through the use of i2 Analyst’s Notebook, by comparing and contrasting the players’ activities within the context of the scene setters presented in Move 1, and the inclusion of Move 2 injects (changes in law and policy such as UNCLOS or Jones Act, catastrophic oil or hazardous substances releases, enforcement of sovereignty claims on disputed waters, and changes in maritime illicit activity), analysts were able to visually identify the similarities and dissonance of players’ assumptions pertaining to the Panama Canal expansion and opening of the Arctic.

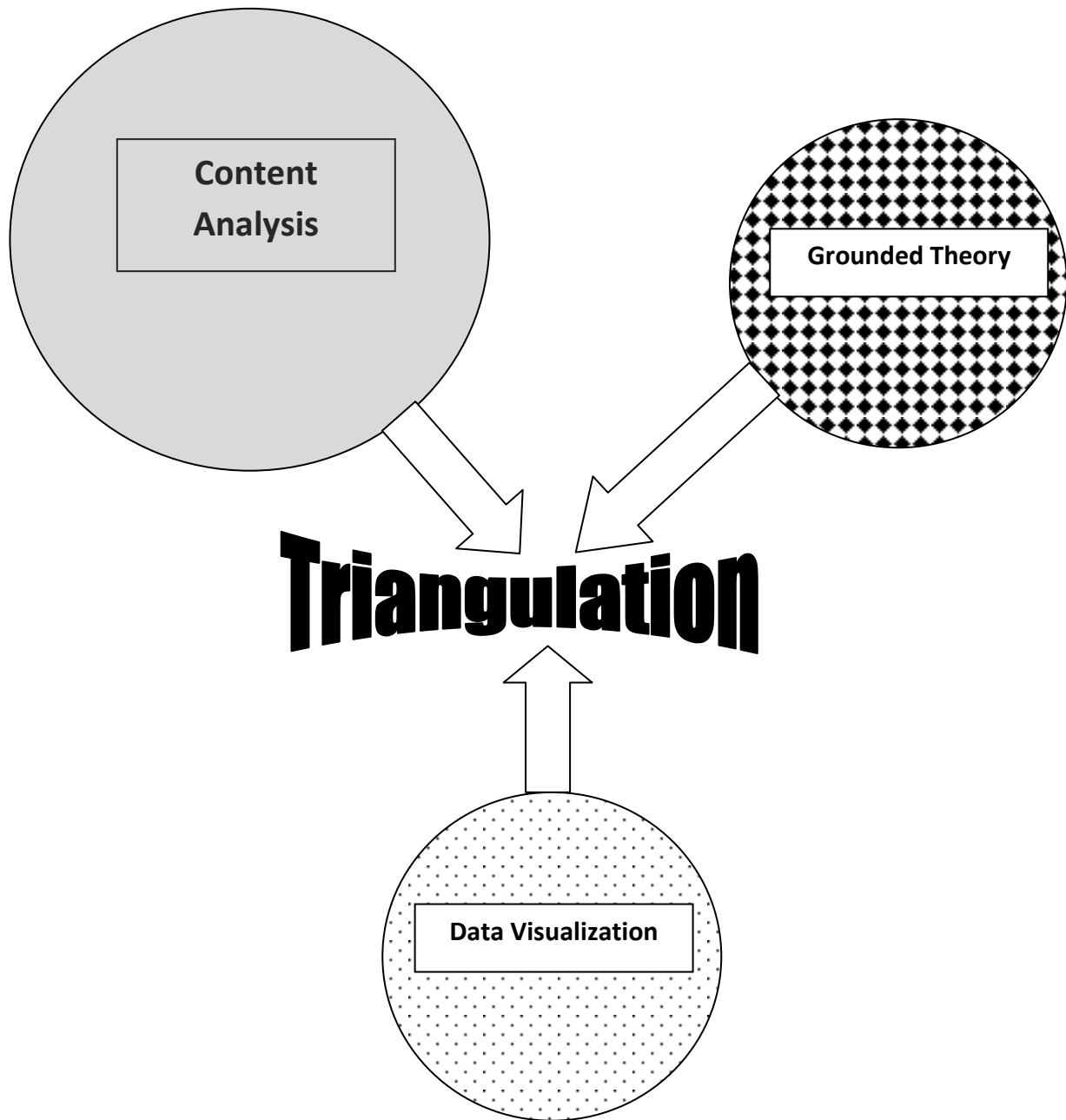


Figure 2.1 – Triangulation Methodology employed in Global Shipping Game

d. Collection Approach

The Global Shipping Game was constructed in a manner that ensured the overarching and subsidiary research questions were adequately addressed. In order to do so, four primary datasets, (1) player surveys, (2) i2 Analyst's Notebook cards/link charts, (3) pre-plenary

PowerPoint slides, and (4) ethnographic notes from cell interactions and plenary sessions were aggregated into post-game analysis.

All of the Data Collection and Analysis Team (DCAT) members involved in these collection efforts received instruction in proper data capture techniques during a pre-game bootstrap session. DCAT members were responsible for ensuring quality assurance/quality control of the datasets submitted during game play. Specifically, DCAT members ensured the following parameters were implemented for these four datasets used for post-game analysis and development of final deliverables:

- Formatting and standardization: Game control staff possessed standard templates for PowerPoint deliverables, i2 Analyst Notebook link/node charts, and Ethnographer notes. Templates were located in folders for each cell and move. Power Point slides were standardized across all four game cells.
- Internal validity: Collection instruments were designed to ensure that accurate conclusions could be drawn from the data. To ensure their proper use during game play, specific internal validity issues with these instruments and the information they were designed to collect was identified during the Alpha and Beta tests. Issues and deficiencies were corrected prior to the start of Move 1.
- External validity: Due to the inherent challenges posed by ensuring consistent, accurate measurement in games, criterion validity was used to determine if the results from an item or set of measures were similar to some external standards or criteria. External validity applies predominately to the baseline questions that were asked in the individual player surveys captured via the Unclassified GAMENET on 8 and 9 December 2010. In order to provide quality controls for data collection, these questions were evaluated by an internal focus group as part of the Alpha and Beta testing process, prior to being deployed in the game.

The detailed file structure for all of the game data capture is provided in Appendix V of this game report (“Knowledge Management Structure for Global Shipping Game”).

Specific roles were assigned to members of the DCAT based upon their experience, education, and interests. The DCAT was subordinate to the Global Shipping Game Director, who was the overall incident commander for this event. The Game Director for the Global Shipping Game was Prof. Douglas Ducharme.

The functions assigned to the DCAT, along with the names of those personnel designated to perform them, were as follows:

DCAT Team Lead: Responsible for all aspects of data management, collection, analysis, and development of post-game deliverables. Any issues involving collection strategies, information technology challenges, concerns with methodologies or analytic procedures, or DCAT personnel were brought to the attention of the DCAT Lead who worked to resolve them with the Game Director. This position served as a major contributor to the production of the Global Shipping Game Report, responsible for organizing, writing, and editing much of the document under the

overall guidance of the Game Director. Also tasked other members of the DCAT with preparation of the short-fused pre-report presentation/briefing and ensured compliance with requisite deadlines. The DCAT Lead for this project was Dr. Hank Brightman.

Cell Facilitators: Experts in the art of garnering information from players and SMEs. The focus of the facilitators, (two per cell) was on exploring the economic and trade patterns that might occur due to widening of the Panama Canal in 2020 and increased access of commercial shipping through the Arctic passages in 2035. Cell facilitators worked with members of the control team to ensure that the player cell deliverables were completed in a thorough and timely manner. The facilitators for each cell were Prof. Dave DellaVolpe and LCDR Nick Miller for Panama Canal Cell A; Mr. Pete Pellegrino and Prof. Mike Martin for Panama Canal Cell B; Mr. Gary McKenna and Mr. Gordon Willard for Arctic Passage Cell C; and Dr. Hank Brightman and CDR Christopher Gray for Arctic Passage Cell D.

Technographers: Each cell retained a technographer who used i2 Analyst Notebook to record data on the linkages and nodes that arose during the cell-based discussions. These data were critical for the data visualization process in the post-game data analysis. The assigned technographers were CDR Gordon Muir, CDR Dustin Martin, CDR Ed Suraci, and Mr. Leif Bergey.

Cell Support: Each cell had an assigned data collection support assistant. These personnel assisted the players in the cell with compiling discussion notes and prepared the post-move outbrief slides. The cell support personnel were CDR John Hanus, LtCol Hunter Kellogg, CDR Bob Perry, and CDR Jeff Uhde.

Template Control Officer: Populated cell templates based on participant discussions and ensured that data were properly saved on the Unclassified GAMENET for subsequent analysis. Performed on-going analysis through the course of game play including review of incoming datasets for common themes and ideas, content analysis, grounded theory, and data visualization. Reported emerging patterns throughout the course of game play to the DCAT Lead for use by Game Director, Designer, and Guided Facilitation/Plenary Session personnel. At the conclusion of the game, developed link charts and supported the data visualization portion of the Game Report. The Template Control Officer for this game was Mr. Leif Bergey (Control Cell).

Ethnographers (Environmental Recorders): Employed a variety of quasi-anthropological, ethnographic techniques to capture player insights and White cell/subject matter expert ideas during the game play. Recorded observations in Microsoft Word for use by Real-Time Analyst(s) both during and after game play. Ethnographers for this game were CDR Don Bosch, LCDR Shiho Rybski, LCDR Jason Israel, and LCDR Dexter Hoag.

WEBIQ Manager: Each cell possessed an expert in the WEBIQ software application in order to (1) train participants in its use for survey data capture, (2) present the political, economic, social, infrastructure, information systems, and military rankings to the facilitators, and (3) provide related technical support as needed. The four WEBIQ experts were CDR Dave Welch, Ms. Charlene Bary-Ingerson, Mr. Bill Hay, and Mr. Gregg Hoffman.

Knowledge Management Officer: Responsible for data management before and during the Global Shipping Game, as well as post-execution organization of files. Coordinated the knowledge management strategy as outlined in Appendix C. Questions regarding file structure, data import/export, and information release were referred to the knowledge management officer. The Collection Lead/Knowledge Management Officer for this project was Mr. Leif Bergey.

III. ANALYSIS & RESULTS

a. Player Demographics

The 73 players who participated in the Global Shipping Game consisted primarily of senior level, officers and executives between the ages of 40 and 49. There were 64 male players and 9 female players. All participants had sufficient knowledge and experience to draw upon when envisioning changes that might take place between now and the 2020/2035 time frames presented in the Panama and Arctic scenarios. The players were selected based on their specialized knowledge of the Panama Canal expansion or the opening of the Arctic. The design team sought a broad range of backgrounds and viewpoints for game play. More than half of the players in the Panama Canal groups came from corporate industry and provided expert perspectives from various aspects of the supply chain. The players in the Arctic groups were primarily from government and academia and provided expertise on Arctic climatology and policy.

The demographic statistics included in this section of the Game Report are based on self-reported responses from the players garnered during the baseline survey administered prior to the start of Move 1 discussions. The 73 players averaged more than 21 years of experience in the four categories of organizations shown in figure 3.1. Many of these non-military players had experience in the military before beginning their government, corporate or academic careers.

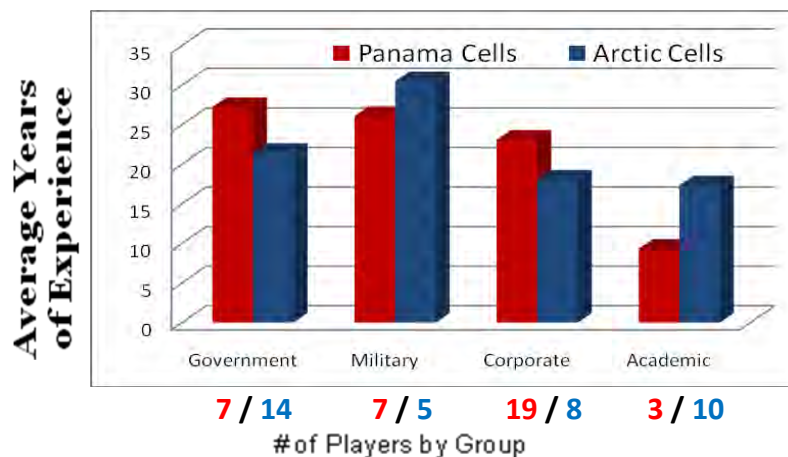


Figure 3.1 – Player Experience from Baseline Survey

The overall education level for Global Shipping Game participants was very high relative to other games conducted at the Naval War College, with more than $\frac{3}{4}$ of the players possessing a minimum of a master's degree in a relevant field, including 15 percent holding an earned doctorate (PhD, EdD, etc.) and 11 percent possessing a law degree (*juris doctorate*). Educational attainment by the players is summarized in figure 3.2.

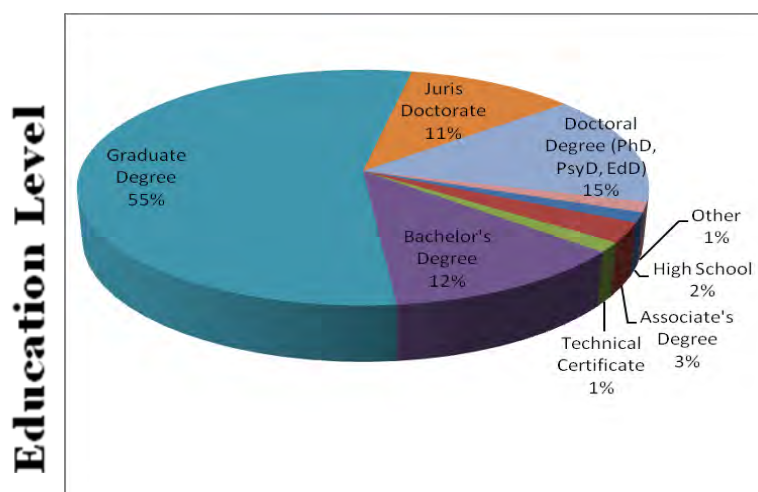


Figure 3.2 – Summary of Game Participants' Education from Baseline Survey

As part of the post-game data coding process, each player was assigned a primary functional area of expertise based on the baseline survey responses. Players' primary functional area of expertise are listed in table 3.1. However, the majority of participants had extensive experience in more than one discipline, so the actual diversity of expertise is even greater than shown in table. Experts on the environment and geologic conditions in the Arctic were classified under "environmental expertise" while those with expertise in other dimensions of the Arctic (social, historical anthropologic) were classified under "regional expertise." These characteristics suggest that the players reflected the intended characteristics (senior level conceptual thinkers with diverse backgrounds in the disciplines related to shipping in the focus regions) desired by the CNO and game design team.

Functional Areas of Expertise	Panama	Arctic
Policy	4	12
Regional Expert	5	4
Environmental	0	8
Logistics	6	2
Operations	6	1
Transportation	5	2
Legal	3	3
Energy	2	3
Finance	2	2
Security	2	0
Diplomacy	1	0

Table 3.1 – Summary of Player Functional Areas Coded from Baseline Surveys

b. Analysis of Game Moves

The post-game analysis team consisted of 20 members from the Naval War College that were trained in both data collection during the game and post-game analytic techniques. A mixed methods approach, consisting of various qualitative and quantitative techniques, was utilized for triangulation purposes in order to achieve credible and reliable findings from the data collected. Game data were coded, grouped in categories, and themes were developed by the analysis team. Data included post-move surveys, pre-plenary slides of insights, ethnographic notes of facilitated discussion, technographer i2 Analyst Notebook note cards/charts, and final plenary outbrief slides.

Panama Canal Expansion

1. **Gradual Change** – Players felt there would be no watershed event resulting from the canal expansion. While the expansion will increase the amount of cargo transiting the canal and new shipping routes will be established, the impact will be more gradual than transformative. Industry experts explain that due to market-driven factors, from building of new Panamax ships to investment in facilities to handle these ships, it will take time for industry to react to these changes. The canal expansion is scheduled to be completed in 2014. The game scenario had the players look for implications of canal expansion by the year 2020. Due to the complexity of the numerous factors to base investment decisions on, the players assessed that much of the impact from the canal expansion would not be manifested for over 10 years.

2. **Infrastructure Limitations** – Given the current supply chain, U.S. East Coast ports generally lack a combination of vessel clearance, cargo handling capabilities, and distribution capacity to support an increase in shipping and larger ships. Most ports lack depth (water draft), while some ports, such as New York, lack under bridge clearance (air draft). Other ports, such as Halifax and Norfolk, have vessel clearance but lack the distribution capacity in terms of rail and highway to distribute products to market. Because of this gradual change, it is anticipated that the U.S. West Coast ports and the intermodal system will continue to be relevant and cost-efficient by the year 2020. Moreover, without changes to infrastructure capabilities of other ports, Norfolk remains the only U.S. East Coast port currently ready to handle the new Panamax commercial ships and thus becomes a larger strategic target from a national security perspective.

Numerous factors influence the future disposition of U.S. East Coast ports and the infrastructure system can be described as a complex network. Development of port facilities are not merely the purview of port directors or industry. The data collected by the i2 technographers (Figure 3.3) depict the complex system of organizations that influence U.S. East Coast ports concerning infrastructure implications.

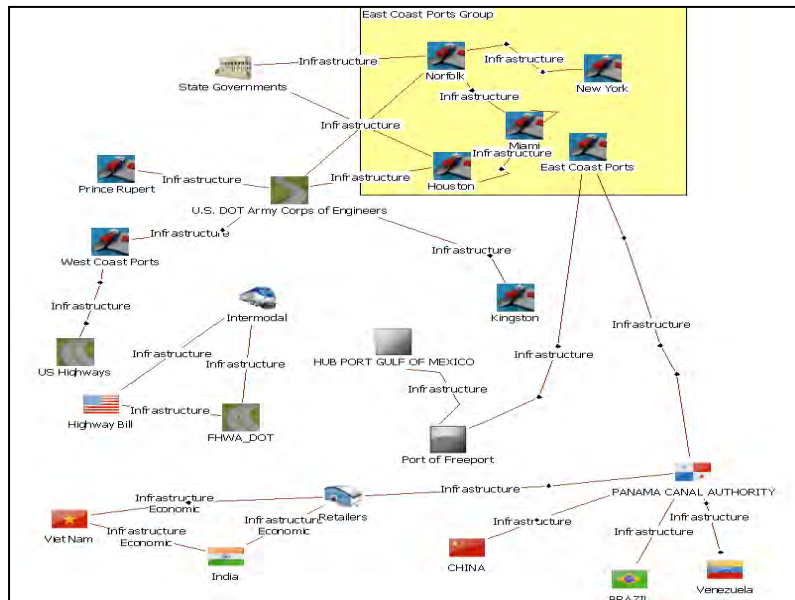


Figure 3.3 – i2 Analyst Notebook Graphic for Panama Canal Infrastructure Discussion

Players assessed that foreign ports would be ready to accept new Panamax ships before U.S. East Coast ports. The influence of decisions by foreign organizations, such as the Panama Canal Authority, and foreign ports will have an impact on decisions to improve U.S. East Coast ports, thereby adding the international political dimension to the already complex model to base infrastructure improvement decisions.

State governments and the U.S. Army Corps of Engineers (USACE) have a role in infrastructure improvements for U.S. East Coast ports. Decisions to improve U.S. infrastructure are not made solely based on market-driven considerations. Alternately, infrastructure decisions are dependent on the local, state, and federal government environment. Therefore, the interaction among infrastructure, economic, and domestic political dimensions at the strategic level represent the complexity of the implications associated with Panama Canal expansion.

3. Predictability/Reliability - This theme emerged from a consistent discussion by industry experts over concern for uncertainty, instability, and non-reliability to explain why these changes impact their interest area. There was general agreement that the expansion will make the Panama Canal more important in future global trade, thereby increasing its importance as a strategic choke point and the need to maintain stability in terms of its economic, political, and security environment.

According to the perspectives of industry experts, predictability is a major concern. Since the entire system of globalization is based on the concept of economic efficiency, any uncertainty in the economic environment creates risk, which means increased costs and decreased profits. Ultimately, these costs are passed on to the consumer and results in feedback to the global economic system due to decreased demand, thereby making the whole system inefficient. The

expansion of the Panama Canal could create a number of threats to the concept of predictability of the future economic environment (figure 3.4).

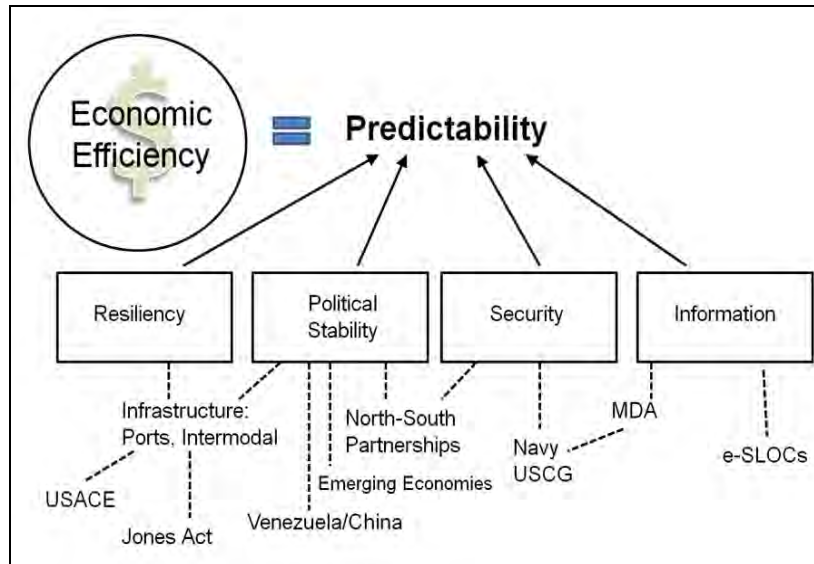


Figure 3.4 – Industry Perspective for Reasons Panama Canal Expansion May Impact Global Shipping

Four categories of factors (resiliency, political stability, security, and information) that impact predictability were identified in the game:

Resiliency – industry experts said infrastructure diversification allows for greater efficiencies. However, uncertainty over what ports will be improved, as determined by entities like the Army Corps of Engineers (USACE), or whether the Jones Act will be modified, could impact the ultimate infrastructure changes and influence the resiliency of the supply chain. Players felt the Jones Act was worthy of further study. Table 3.2 depicts player survey results from the Panama Canal groups.

Both Panama Canal groups had statistically significant positive response profiles (indicating agreement) with a survey prompt of “repeal or modification of the Jones Act would affect my business, industry, or area of interest.” There was no difference (p-value is 0.26, greater than 0.05) between the two Panama Canal groups and the results are robust when the tests are applied to the full Panama Canal sample. Players favored the review of the Jones Act based on economic factors. With U.S. shipbuilding as the prominent issue, players felt a revision of the Jones Act would make short sea shipping more economically

Based on the definition of Jones Act provided, the scene setter planning factors, and the subsequent discussion in my group, repeal or modification of the Jones Act would affect my business, industry, or area of service.

t-Test: Two-Sample Assuming Equal Variances		
	PANAMA A	PANAMA B
Mean	0.705882	0.941176
Variance	1.220588	0.933824
Observations	17	17
P(T<=t) one-tail	0.256686	
t Critical one-tail	1.693889	
P(T<=t) two-tail	0.513373	
t Critical two-tail	2.036933	

Table 3.2 – Survey results for Panama Canal groups concerning Jones Act

viable, but reliability would drive shipping methods more than cost. Jones Act modification concerning the use of U.S. built ships could affect the balance between short sea shipping and intermodal shipping once East Coast infrastructure has been improved to accommodate greater than 8k TEU ships.

Political Stability – new partnerships and relationships will surely develop as changes in trade patterns emerge. A major uncertainty involves to what extent emerging economies will capitalize on the expansion and trade opportunities. At a minimum, players cited that instability of the country of Panama would negatively impact the access to and commercial use of the Panama Canal. Also, investment in Venezuelan ports/terminals by China could create uncertainty in the political landscape of the region.

Security – at a minimum, players felt the Panama Canal becomes a greater strategic choke point after the expansion and the physical security of the canal will be paramount. Furthermore, as a result of increased vessel traffic and changes in partnerships, illicit activities or potential state competition could emerge as a source of instability in the region. Players identified the need for robust Navy and Coast Guard (USCG) capabilities for law enforcement and deterrent purposes.

Information – understanding the strategic environment, through capabilities provided by Maritime Domain Awareness (MDA), is important in order for senior executives to make market decisions. Furthermore, protection of the information network, or e-SLOC, that support the maritime trade network is critical to a predictable economic environment. The concept of e-SLOCs is discussed further in theme number 5 of this section.

When asked whether the continued non-ratification by the United States of the United Nations Convention on the Law of the Sea would affect their business, industry, or area of service, players were neutral in their assessment. Table 3.3 depicts the results showing that both Panama Canal groups had neutral response profiles suggesting that players neither agreed nor disagreed with the statement (means of -0.27 and 0). There was no difference (p-value is 0.20, greater than 0.05) between the two groups. The results are robust when the tests are applied to the full Panama Canal sample. Discussion of the players reflected that the players in the Panama Canal groups generally supported the ratification of UNCLOS by the United States. However, whether the Panama Canal expanded or not, it did not impact the importance of the U.S. need to ratify UNCLOS.

Based on the scene setter planning factors, and the subsequent discussion in my group the continued non-ratification by the United States of UNCLOS would affect their business, industry, or area of service.

t-Test: Two-Sample Assuming Equal Variances		
	PANAMA A	PANAMA B
Mean	-0.26667	0
Variance	0.495238	1
Observations	15	15
P(T<=t) one-tail	0.202742	
t Critical one-tail	1.701131	
P(T<=t) two-tail	0.405485	
t Critical two-tail	2.048407	

Table 3.3 – Survey results for Panama Canal groups concerning UNCLOS

4. New Relationships/Partnerships - New relationships and partnerships that will emerge as a result of changes in trade patterns based on stakeholder equity. These changes will reflect more Northeast-Southwest and Northwest-Southeast crisscross shipping through the canal. Recognizing that foreign ports would be ready to accept new Panamax ships before U.S. ports, players identified the need for increased cooperation with whichever country wins the infrastructure race. Furthermore, as ship transit to countries other than the United States, international stakeholders will be more vested in maintaining security. Building partnerships will emerge as important interests of international actors. As a result, Cooperative Maritime Security Agreements should expand with canal expansion.

Some of these relationships may create uncertainty and complicate the political status quo in the region, such as the unpredictable environment that may emerge as a result of future China investment in and trade with Venezuela.

One must note the role of industry in establishing future relationships and emerging partnerships that may result from the Panama Canal expansion. The relationships from the political perspective are not exclusively between U.S. government entities and foreign entities. The i2 Analyst Notebook graphic (Figure 3.5) that depicts the political context of player discussion illustrates the numerous linkages that industry entities have with both U.S. government entities and foreign entities.

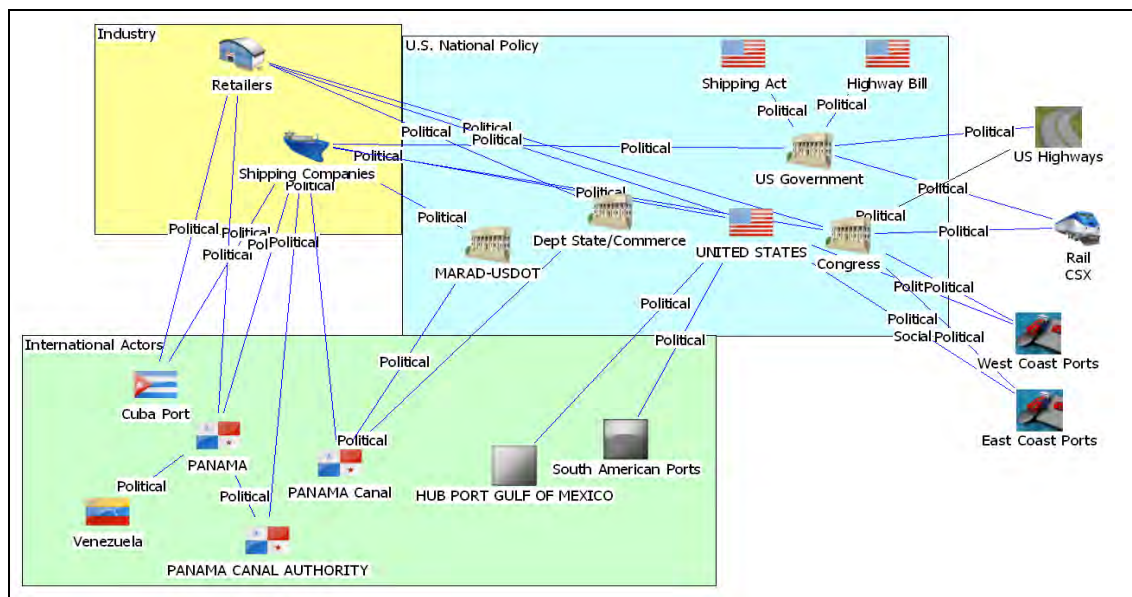


Figure 3.5 – i2 Analyst Notebook Graphic for Panama Canal Political Discussion

5. Cyber Security - The players discussed the importance of cyber security in relation to global shipping and trade. The concept of e-SLOCs emerged from the analysis of their discussion. An e-SLOC is the “cyber network that supports the global maritime trade network.” Industry

experts felt that disruptions to the e-SLOCs would have a more enduring effect on the entire supply chain than physical barriers. They felt that shipping can always “go around” a physical barrier and find a way to get to the market. But the cyber network is integral to the entire supply chain operation and an act of information denial could degrade the entire system.

The industry perspective of the importance of security of cyber/information systems is summarized by the i2 Analyst Notebook graphic in Figure 3.6.

Any degradation to cyber capability will grind the global trade system to a halt. Finances, lading bills, slot times, reservations, inventories, etc. are all electronic transactions that would have to be replaced with old-school pen and paper operations. To sustain operations under a persistent degraded cyber capability would require massive investment in labor to handle a paper based system. This is the doomsday scenario for all in the room. Global trade would grind to a halt while everyone got situational awareness on what goods were in transit and where they are. (summary of discussion by Shipping Company representative)

Players discussed potential vulnerabilities of a cyber attack to include shipping communications, financial transactions, scheduling, and lock operations.

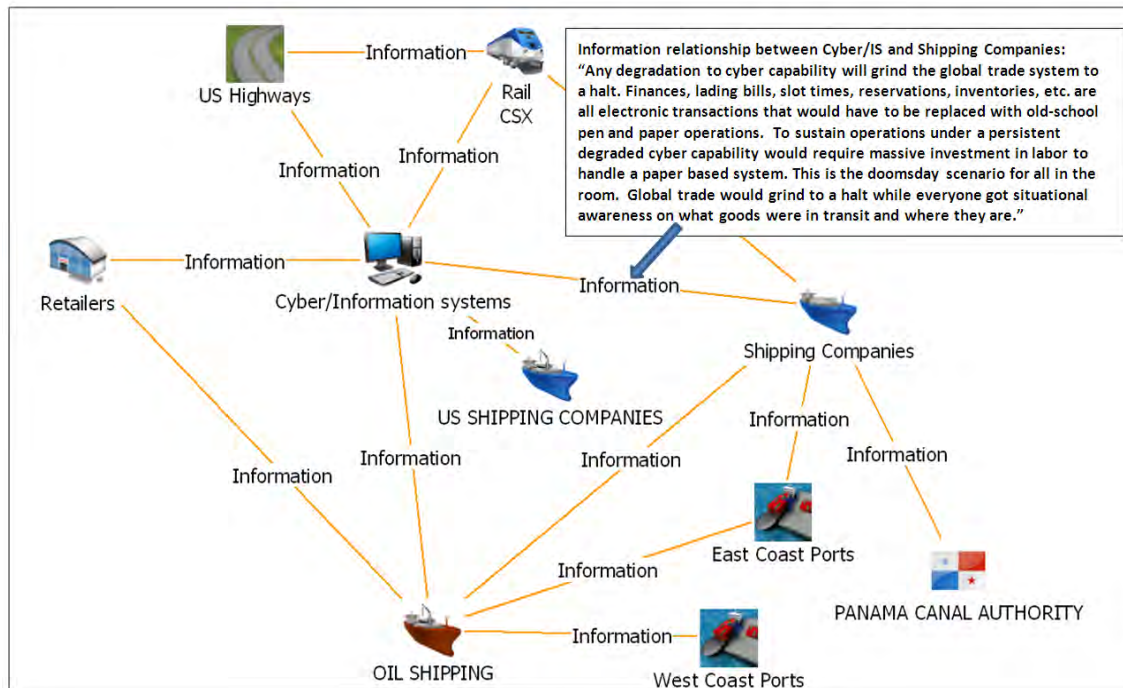


Figure 3.6 – i2 Analyst Notebook Graphic for Panama Canal Cyber Discussion

Arctic Opening

1. **Gradual Change** - According to players in the Arctic groups, the projected changes in shipping patterns will occur gradually rather than overnight. The major reason for this gradual change is due to the gradual nature of the climate change taking place. Increased global demand and technological advances could accelerate changes in shipping patterns though. However, preparation for these changes by industries and governments will require long lead times of a decade or more in some cases.

2. **Arctic economic viability** – Players said that the key determinant of long term geo-strategic importance of the Arctic concerns the economic opportunity in the region. Understanding the extent of the economic viability in the Arctic is necessary to determine the extent of implications and activity needed in the region. The nature of this economic viability will be more a result of resource extraction and thus increase the amount of destination shipping (to and from the Arctic) rather than trade route shipping (through the Arctic). The trans-Arctic shipping is not expected to be commercially viable until after 2035 since the seasonal nature of shipping routes limits the effectiveness as a global trade route for tankers and container traffic. However, there could be some small increase in trans-Arctic shipping for the polar-capable fleets of the Arctic states. Subsequently, the economic viability of resource exploitation in the Arctic, as a key indicator of its strategic importance, should drive and inform key U.S. government policies, investments, and decisions. Thus, continuous assessment of this economic viability is warranted.

The Arctic today is not economically viable due to its harsh climate, lack of demand, and insufficient technology to extract resources and operate in the Arctic. However, if climate change and glacier melt continue along its projected trend line, the potential for resource extraction could make the Arctic economically viable by 2035. Resources could include oil/gas reserves, minerals, fisheries, and fresh water. However, energy extraction can be expected to be the principal driver for Arctic activity. As the world's population swells from 6 to 8 billion, there will be greater demands on energy requirements, of which 80% could be fossil fuels by the year 2035. Likewise, increased global population and economic development will cause greater demands for sea-borne protein and minerals. Obstacles to economically viable resource extraction (cost of infrastructure, development of improved extraction technology, environmental concerns) will be overcome if potential economic benefits are substantial.

Understanding the extent of climate change and scope of available resources is key to determining the degree of economic viability in the Arctic (figure 3.7). The capability needed to provide this understanding concerns the concept of Arctic Domain Awareness (ADA). ADA is Maritime Domain Awareness (MDA) within the context of the unique Arctic ecosystem, considering the affected human, social, cultural, economic, environmental, and physical factors. It is an enabler to develop knowledge of Arctic Environment, make accurate assessments of economic viability/exploitation, understand activities of all Arctic partners, and develop a deeper

regional understanding of the entire Arctic ecosystem. ADA allows measurement of the potential for resource extraction and the ensuing economic viability in the Arctic. Thus, as the economic viability of the Arctic grows, so does the need for Arctic Domain Awareness, as represented by the use of bi-directional arrows between economic viability and ADA in figure 3.7.

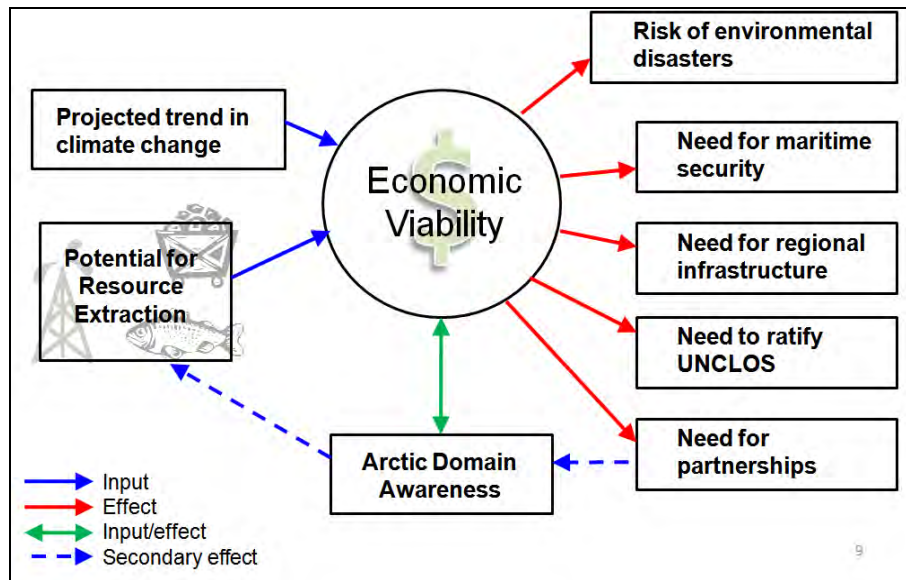


Figure 3.7 – Implications of Arctic Economic Viability

As the economic viability of the Arctic increases, there will be greater needs for partnerships, ratification of UNCLOS, regional infrastructure, and maritime security. Also, the risk of environmental disasters will rise with the increase as the Arctic experiences economic development. Players felt that environmental disasters, such as oil spills, are inevitable as energy extraction and destination shipping increase in the harsh region since the Arctic environment complicates disaster response and increases its severity. Many experts felt that even after a disaster, extraction efforts would not be deterred due to potential energy gains.

Addressing these needs for partnerships, ratification of UNCLOS, regional infrastructure, and maritime security, while mitigating risk depends on the nature of economic viability one could expect. Therefore, as an initial step, it is imperative to develop ADA in order to measure the degree of economic viability of the Arctic. In addition to developing assets/technology to explore the Arctic, players felt it was critical to build partnerships among the Arctic nations, industry, and other stakeholders in order to develop ADA deemed critical for understanding potential security implications in the region. In this way, engagement and maritime partnerships serve as force multipliers for increased maritime domain awareness as well as crisis response.

The United States has maintained a leadership role in Arctic issues. The Arctic Council serves as the primary engagement mechanism for the United States to build partnerships and relationships. Currently, U.S. influence in the Arctic relies on bilateral and multilateral partnerships in the region. As Arctic economic viability increases in the future, it will be increasingly important for the Arctic nations to work together and for the U.S. to be a part of this collaboration. U.S. regional engagement in the Arctic should include a military component to ensure that the U.S. Coast Guard and U.S. Navy have a voice in discussions. The political dimension among nations with interest in the Arctic can be described as a balancing act. Those with the most influence and leverage may be able to alter the balance as it suits their particular needs.

The Arctic Council role may evolve to include new members or address other regional governance issues such as security. NATO presence and influence in the Arctic could be problematic, because it does not include Sweden, Russia, and Finland in its activities. Moreover, an independent Greenland, strengthened by oil wealth, could become an important player in regional affairs. The role of China, Japan, and the Republic of Korea may continue to evolve as key non-Arctic states motivated by energy demand and importance of fisheries. The activities of outside stakeholders may impact the interests of indigenous people of the Arctic and should not be overlooked.

According to i2 Analyst Notebook data (figure 3.8), players discussed a threat to U.S. partnerships in the Arctic as a result of the increased political relationships among the Russian Federation, China, and European Union. As the opening of the passage facilitates increased trade among these economic entities, the emerging partnerships that form outside the Arctic Council could threaten the leadership role that the United States enjoys among the Arctic nations. Specifically, the players felt that “opening of the passage could lead to diminishment of U.S. political and economic power.”

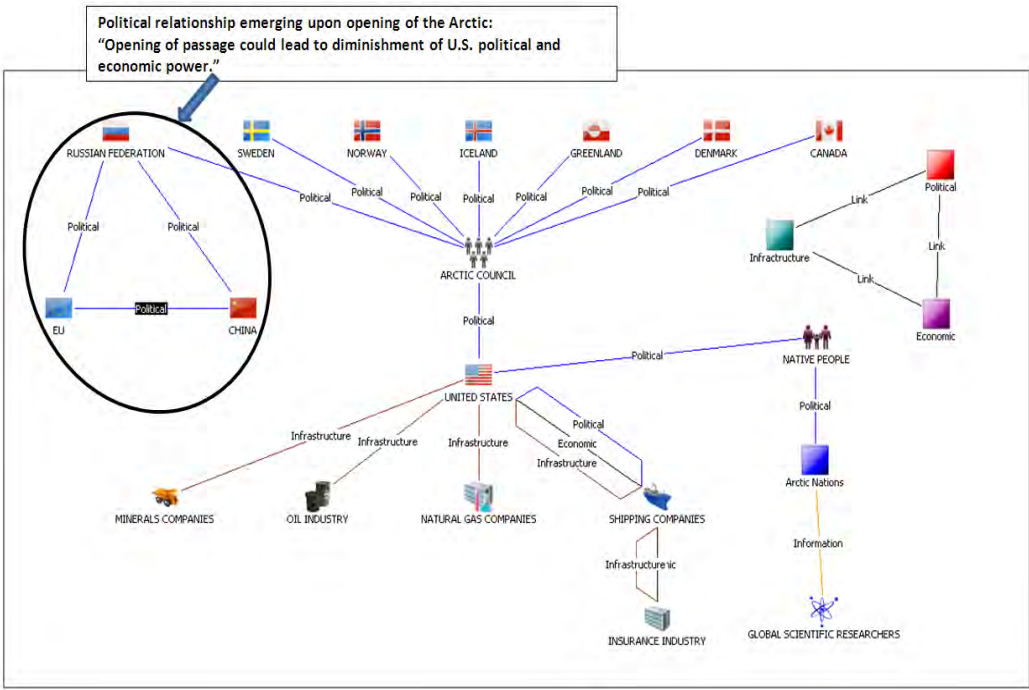


Figure 3.8 – i2 Analyst Notebook Graphic for Arctic Discussion

Players felt that U.S. leadership and leverage should not be underestimated, but requires ongoing efforts to bolster influence in international forums associated with the Arctic. The United States should take a leading role in forums like the International Maritime Organization (IMO) where Arctic regulations, such as the Polar Shipping Code, are developed, coordinated, and adopted. The United States ratification of UNCLOS would support U.S. leadership and influence through strengthening the international forums that ongoing partnerships are based on.

3. U.S. Ratification of UNCLOS - Immediate U.S. ratification of UNCLOS was strongly supported by all players. Both Arctic groups had statistically significant positive response profiles (indicating agreement) with a survey prompt of “continued non-ratification by the U.S. of UNCLOS would affect my business, industry, or area of service.” The data suggest there to be no difference (p-value is 0.23, greater than 0.05) between the Arctic groups and the results are robust when the tests are applied to the full Arctic sample.

If the United States continues to delay ratification of UNCLOS, then the U.S. could incur substantial risk in terms of economic development in the Arctic and to its position as a global leader in maritime issues. There

Based on the scene setter planning factors, and the subsequent discussion in my group the continued non-ratification by the United States of UNCLOS would affect their business, industry, or area of service.		
t-Test: Two-Sample Assuming Equal Variances		
	ARCTIC C	ARCTIC D
Mean	0.882353	0.6
Variance	1.110294	1.257143
Observations	17	15
P(T<=t) one-tail	0.234289	
t Critical one-tail	1.697261	
P(T<=t) two-tail	0.468579	
t Critical two-tail	2.042272	

Table 3.4 – Survey results for Arctic groups concerning UNCLOS

was a certain minority that, while supportive of U.S. ratification of UNCLOS, suggested that current U.S. military and diplomatic power, if maintained in the future, provides enough influence or leverage to ensure U.S. interests are maintained in the absence of UNCLOS ratification.

Throughout the game, numerous reasons for U.S. ratification of UNCLOS were cited. First, without ratification, the U.S. does not have a seat at the table. UNCLOS was originally drafted with U.S. interests in mind. Now other states that have ratified it can modify it while the U.S. sits out. If the U.S. ratifies it after modification, then it must be accepted “as is” with amendments that may not have U.S. interests in mind. The longer the United States delays ratification of UNCLOS, the greater the likelihood that U.S. interests could be threatened or sub-optimized.

A vital U.S. interest concerns the ability to file for an Expanded Continental Shelf Claim in order to extract resources from the sea beyond the 200 miles Economic Exclusion Zone. Furthermore, ratification would provide the certainty, or predictability, of the future security and political environment that industry desires in order to invest in economic development of the region. Ratification provides the confidence necessary to attract outside investment necessitated by the major financial and technological requirements for energy exploitation in the Arctic. For these reasons, non-ratification risks damage to future U.S. economic interests.

Another risk of non-ratification of UNCLOS involves the potential for impact on other interests and other regions. Other states may disregard key aspects of international law, such as Freedom of Navigation (FON) or rights under the Economic Exclusion Zone (EEZ). That is, others may feel that if the U.S. government does not recognize the rules, then why should they. The effects of nations withdrawing from the convention, or challenging it, could bleed over into unintended consequences elsewhere, such as in the South China Sea.

Finally, the linkage between the need for the U.S. to maintain a strong position to defend U.S. and allies interests and the need to ratify UNCLOS has been cited in previous war games with international players at the Naval War College, such as the recent Global Maritime Partnership Game. Players perceived a gradual erosion of U.S. influence among current and future maritime partners that may have negative effects on U.S. interests. The need for U.S. leadership to ratify UNCLOS is warranted in order to prevent the erosion of U.S. influence among partners and in theaters of operation.

c. Limitations of Game Design and Analysis

One of the greatest challenges for the Naval War College, War Gaming Department is to develop a game that provides the robust insights into an issue or problem sought by the game's sponsor. Accordingly, managing stakeholder expectations about what final game report will tell them with respect to broad-based implications is essential. Stakeholders often seek findings that will provide them with predictive conclusions for decision-making purposes. Unfortunately, gaming is a predominately descriptive process because games are not experiments. Even if a game is repeated, it lacks sufficient controls over player inputs and the central limit theorem for a distribution to ensure validity. In other words, sponsors should not attempt to draw inferences beyond what a specific group of players did in a particular game to yield generalizability (the ability to apply the findings observed for a small population to the broader world around us). The Global Shipping Game is no exception to this premise.

This game was designed to be highly inductive for Move 1 in order to garner broad-based thoughts and insights on the overarching research question concerning the Panama Canal expansion and Arctic opening paradigms and their relationship to U.S. security interests. It was designed to be highly deductive for Move 2 in order to delve more deeply into the subsidiary research questions and the CNO's hypothesis on the ratification/non-ratification of UNCLOS. With respect to the latter, it should be noted that the researchers assigned to this project assumed a null hypothesis, that there is no relationship between the status of UNCLOS treaty ratification and its impact on U.S. strategic security interests based on the Panama Canal and Arctic paradigms.

The value gained from the interpretation of insights derived from game play results from the ability to identify key themes and recommendations concerning global shipping patterns. From these insights, hypotheses about ratifying UNCLOS and assigning U.S. naval assets in a manner that best protects global maritime commerce while ensuring U.S. security interests can be tested in future gaming or research efforts. In this way, the inductive processes utilized to answer the overarching research question in the Global Shipping Game will set the conditions to be tested in future deductive processes and games.

Analysis effectiveness can be measured in terms of internal and external validity. Internal validity refers to the extent that cause-and-effect relationships identified in the game can be inferred from collected data. External validity refers to the extent that the results in the game accurately reflect the external conditions in the real-world. A number of potential threats to internal and external validity need to be accounted for and the analysis effort must attempt to minimize the effect of these threats.

Two threats to internal validity were the quality of the data collected and the accuracy of the analytical techniques used to review these data. To ensure quality data collection, the DCAT

relied heavily on individual surveys, cell-derived PowerPoint presentations, and i2 Analyst's Notebook cards and link/node charts. Insights extracted from these data sources were subsequently cross-checked, or triangulated, with other data sets including the ethnographer's notes to ensure accuracy and conclusiveness. To ensure the correct analytical technique was used, multiple methods and tools were employed to review the same data. These methods were content analysis, grounded theory, and data visualization. Although internal validity threat mitigation strategies were used, the greatest limitation to developing insights and themes from the data resulted from the diverse backgrounds of participants. Despite their expertise, different lexicons and perspectives of the same situation added a level of difficulty to interpretation.

To explore the degree of external validity, one must ask whether the data allow generalization to other subjects among the population. To answer this inquiry, one must then look at the demographics data of the participants. The game was designed to inspire innovative thinking given a complex problem. To think beyond the most likely case, and define problems from holistic approach, players were selected to represent a cross-section of military, government, and academic perspectives.

IV. IMPLICATIONS & RECOMMENDATIONS

In focusing on the broad security implications posed by projected changes in shipping patterns as a result of the Panama Canal expansion and opening of the Arctic, the players sought to identify implications concerning the nature of (1) relationships, (2) information, and (3) capabilities that define the future strategic environment in the context of global maritime shipping (figure 4.1).

	Panama Groups	Arctic Groups
Relationships	Cooperative security agreements will become more important in the region due to increased N-S and E-W crisscross trade patterns	Arctic partnerships for MDA and crisis response U.S. leadership required (but difficult without UNCLOS ratification)
Information	Need to focus on cyber security associated with global trade	Immediate need for Arctic Domain Awareness
Capabilities	Need for investment in U.S. East Coast ports and infrastructure. Transshipment may require increased regional maritime security/law enforcement	Need for operating capabilities in Arctic environment with USCG providing presence and USN supporting as needed

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Figure 4.1 – Implications Shipping Pattern Changes to National Security

With respect to building (1) relationships, the players in the Panama groups identified the need for cooperative security agreements among regional stakeholders in order to ensure predictability of the economic environment. To enhance cooperative security, players recommended a Panamax Exercise to include regional partners as well as global shipping organizations.

Players in the Arctic groups identified the need for building Arctic partnerships and focusing on a “whole of government” approach in order to build Arctic Domain Awareness (ADA), with an emphasis on the vastness of the maritime passages and respond to crises. Players in the Arctic groups asserted that the United States should take an active leadership role in Arctic policies, issues, and development. Players further asserted that UNCLOS ratification would facilitate establishing the U.S. as a leader in Arctic issues including ADA. Conversely, continued non-ratification of UNCLOS could result in Russia emerging as the dominant power in the region, potentially claiming sovereignty of half the Arctic basin, and assuming a leadership role concerning Arctic issues (Schlauder, 2007). Overall, the United States role in the Arctic could be marginalized if actions, policies, and investments fail to keep pace with economic development in the Arctic.

Regarding the value of (2) information, in the Panama Canal expansion scenario, the players identified the need for cyber security in order to support global maritime trade. Also emphasizing the implications of information, players engaged in the opening of the Arctic scenario identified that developing Arctic Domain Awareness was the first step, along with ratification of UNCLOS, in securing U.S. interests concerning economic development of the Arctic. Once a baseline ADA has been established, then continued Maritime Domain Awareness must support monitoring of potential threats to U.S. and partner interests in the region.

With respect to developing (3) capabilities, market driven investment in U.S. East Coast ports and infrastructure was identified as essential in preparation for shipping pattern changes as a result of the Panama Canal expansion. As foreign ports will be ready to receive new Panamax ships first, transshipment operations will increase as a short term solution until U.S. East Coast ports are ready with improved infrastructure. Increased transshipment will require additional regional maritime security and law enforcement operations in the region.

The type of capabilities needed to prepare for the opening of the Arctic involve the ability to operate in the Arctic with the Coast Guard providing presence and the Navy being capable of operating in the Arctic environment as needed. Players felt the U.S. Coast Guard mission set makes them the logical lead for Arctic security and safety as well as maintaining presence and protecting sovereignty claims. The U.S. Navy role should be to support the U.S. Coast Guard for specific missions, but also to conduct continuous environmental assessment and prepare to react rapidly to an evolving Arctic security dynamic. Overall, the U.S. Navy and U.S. Coast Guard should act as one team for addressing Arctic security issues, increasing understanding of the Arctic, and seeking funding for Arctic missions. Although players assessed illicit activity in the Arctic region to be minimal, increased economic opportunity could provide a target for opportunistic actors, such as terrorists or illegal fishing. Schlauder (2007) proffers that needed U.S. capabilities must overcome the challenges of operating in the Arctic, such as:

Space – Limited satellite communications and surveillance assets.

Aviation – Harsh operating environment for logistics, patrol, and anti-submarine aircraft.

Surface ships – Lack of reinforced hulls, propellers, and sonar as well as insufficient ice breaking platforms.

Weapons systems – Unknown weapon systems performance due to insufficient testing.

Inter-agency – Extensive surveying needed to update nautical chart data and deploy navigational aids.

Basing and logistics – Infrastructure needed to support sustained operations.

In summary, according to the impressive group of recognized experts that participated in this game, these three broad areas of focus are the things that U.S. leadership could focus on, in terms of dedicating resources and effort, in order to ensure national security interests are maintained in the future given projected changes in shipping patterns. That is, (1) investment in building relationships, (2) attaining and securing information, and (3) developing capabilities represents the overarching guidance to implementing a vision for securing the maritime domain in order to ensure efficacy in global maritime shipping. These could also be areas for further study through follow-on gaming or other research methods.

REFERENCES

- Armstrong, T. (1952). *Northern sea route*. London, UK: Cambridge University Press.
- Belov, M. I. (2000). *Russians in the Bering Strait, 1648-1791*. Anchorage, AK: White Stone Press.
- Bittner, J. (2010). *Understanding the Economic, Environmental and Energy Consequences of the Panama Canal Expansion on Midwest Grain and Agricultural Exports: State of Wisconsin/Department of Transportation*. Retrieved 19 January 2011 from http://www.wistrans.org/cfire/Research/CFIRE/GY03/18/03-18_CFIRE_2010_Q1.pdf
- Dewar, J. A., & Wachs, M. (2006). *Transportation planning, climate change, and decisionmaking under uncertainty: Commissioned paper for Committee on Climate Change and U.S. Department of Transportation*. Washington, DC: Transportation Research Board.
- Harrison, R., Hutson, N., & Prasad, V. (2007). *Containerization and related trends at Texas deep water port*. University of Texas. Retrieved 19 January 2011 from http://www.utexas.edu/research/ctr/pdf_reports/0_5538_P2.pdf
- Peterson, T. C., McGuirk, M., Houston, T. G., Horvitz, A. H., & Wehner, M. F. (2008). *Climate variability and change with implications for transportation*: Proceedings of the 20th conference on climate variability and change. Retrieved 19 January 2011 from http://ams.confex.com/ams/88Annual/techprogram/program_438.htm
- Schlauder, W. E. (2007). *Adapting to a changing world: The United States, climate change, and the Arctic maritime commons*. (Research paper). Naval War College, Newport, RI.

APPENDICES AND SUPPLEMENTAL DATA

- a. Appendix A - Attendees**
- b. Appendix B - Schedule of Events**
- c. Appendix C - Knowledge Management Strategy**
- d. Appendix D - Post-Move Plenary Slides**
- e. Appendix E - Final Plenary - Group Outbriefs**
- f. Appendix F - Scene Setter Planning Factors**
- g. Appendix G - Survey Questions**

Appendix A - Attendees

Addison, Vic, CAPT	Advanced Concepts, OPNAV, US Navy
Alic, Lejla, Ms.	Energy Market Analyst, Department of Energy
Antrim, Caitlyn, Ms.	Executive Director, Rule of Law Committee for the Oceans
Arntzen, Bruce, Dr.	Senior Research Director, MIT Center for Transportation & Logistics
Ayers, Ferrell, Ms.	Analyst, Center on Climate Change and National Security
Basch, Darlene, Ms.	Analyst, Department of State/INR
Bohnert, Roger, Mr.	Deputy Associate Administrator, Maritime Administration
Boock, Mike, CAPT	Commanding Officer, Naval Justice School
Brigham, Lawson, Dr.	Distinguished Professor, Geography and Arctic Policy, U. of Alaska
Buono, Jack, Mr.	General Manager Global Marine Transportation, ExxonMobil
Chircop, Aldo, Dr.	Professor, Schulich School of Law, Dalhousie University
Cleary, Jamie, Mr.	AC II Underwriter - War and Political Risks Account, Amlin
Clemente-Colón, Pablo, Dr.	Chief Scientist, US National Ice Center
Collins, Gabe, Mr.	Co-founder, China SignPost
Cooke, Karl, CAPT	Director of Strategy and Policy, NAVEUR
Cox, Joe, Mr.	President and CEO, Chamber of Shipping of America
Dalton, Sean, Mr.	Senior Vice President, Zurich Insurance Company
Dilulio, Dom, Mr.	Program Analyst, US Coast Guard
Duffy, Rob, Mr.	General Manager, General Electric
Fernandez, Courtney, Ms.	Global Strategic Analyst, Strategic Assessment Team
Feygin, Anatol, Mr.	Vice President, Energy Strategist, Loews Corporation
Fludd, Lennis, Mr.	NMCO Chief of Staff, Maritime Administration
Furst, Tony, Mr.	Director of Freight and Management, Federal Highway Admin
Galvez, Cristian, CDR	Defense and Naval Attaché, Embassy of Chile in Panama
Garon, Richard, Mr.	PhD Student, Dept. of Political Science, Laval University
Gilbert, Gary, Mr.	Senior Vice President, Hutchison Port Holdings
Gove, Dave, RADM (Ret)	Director, Undersea Technologies, Raytheon
Hamilla, Zachary, Mr.	Arctic Strategic Analyst, Office of Naval Intelligence
Herberg, Mikkal, Mr.	Research Director, National Bureau of Asian Research
Hill, Kevin, CAPT	N8/N9, COMSECONDFLT, US Navy
Iglesias Castrejon, Gerardo, LCDR	CESNAV War Gaming Department, Mexican Navy
Ingimundarson, Valur, Dr.	Professor of History, University of Iceland
Jackson, David, Mr.	Director, Canadian Ice Service
Jones, Laura, Ms.	Operations Analyst, STRATCOM
Keenan, Steven, Mr.	Senior Political Advisor, US Senate
Kelly, Lon, Mr.	Bureau of Land Management, US Department of the Interior
Khandpur, Rajiv, Mr.	Chief, Office of Marine Trans. Systems, US Coast Guard
Koon, Bryan, Mr.	Director of Emergency Management, Walmart
Koss, Anthony, LCDR	N8/N9, COMSECONDFLT, US Navy

Appendix A – Attendees (Continued)

Krafsky, Jennifer, Ms.	Senior Director, Human Relations, Walmart
Krarup, Juliet, Ms.	Desk Officer for Denmark and Iceland, US Department of State
Lloyd, Craig, CAPT	Chief of Response, US Coast Guard District 17
Mahnken, Thomas, Prof.	Professor of Strategy, US Naval War College
Malloy, William, CAPT (Ret)	President, The Malloy Group
Malmin, O. Kim, Dr.	CNA Representative, COMUSNAVSO/C4F
Martin, Peter, Mr.	Foreign Service Officer/Analyst, Department of State/INR
Matthews, Evan, Mr.	Director, Port of Davisville, Quonset Development Corporation
McBride, Blake, CDR	Arctic Affairs Officer, Task Force Climate Change
McDonald, Bill, Mr.	Maritime Administration, US Naval War College
Miller, Frank, Mr.	Vice President, Dell Computer Corporation
Neill, Sam, CAPT	Joint Chiefs of Staff, Chairman's Advisory Group, US Coast Guard
Newton, George, CAPT (Ret)	Advisor, U.S. Arctic Research Commission
Niemen, Pablo, CDR	International Fellow, US Naval War College
O'Brien, Duncan, Mr.	General Manager, General Electric
O'Brien, Greg, Mr.	Oceans and Polar Affairs, Department of State
O'Mahoney, Patrick, LCDR	Office of Legislative Affairs, US Navy
Papavizas, Charlie, Mr.	Partner, Winston & Strawn
Pelletier, Sébastien, Mr.	PhD Student, Dept. of Geography, Laval University
Proshutinsky, Andrey, Dr.	Senior Scientist, Woods Hole Oceanographic Institution
Putt, Nathan, Mr.	Senior Systems Manager, Walmart
Reich, John, Mr.	Director Risk Management for Intermodal Operations, CSX Railroad
Roach, J. Ashley, CAPT (Ret)	Law of the Sea Expert, US Navy/Department of State
Robinson, Sergio, VADM (Ret)	Professor, Chilean Navy
Rubio Marquez, Sergio, CDR	CESNAV War Gaming Department, Mexican Navy
Sanborn, David, Mr.	Chief Executive Officer, International Transportation Systems
Sappio, Robert, Mr.	Senior Vice President, Pan America Trade, APL
Shafer, Stephen, Mr.	Economist, Office of Policy and Plans, Maritime Administration
Silva, Stephen, Mr.	Senior Vice President for Global Logistics, HASBRO
Staples, Jim, CAPT (Ret)	President, Ocean River Consulting
Starks, Marcus, CDR	Maritime Liaison Unit, COMUSNAVSO/FOURTHFLT
Strong, Corey, Ms.	Military Resale Program Manager, UPS Supply Chain Solutions
Taylor, Giles, Mr.	President, Trans-Solutions
Taylor, Paul, Amb (Ret)	Professor Emeritus, US Naval War College
Thomas, Steve, Mr.	Manager, Competitive Intelligence, United Parcel Service
Thurston, Dennis, Mr.	Global Energy Analyst, Bureau of Ocean Energy Management
Tilmon, Chuck, Mr.	Senior Director, Replenishment, Walmart
Van Hook, Gordan, CAPT (Ret)	Senior Director, Innovation and Concept Dev., Maersk Line, Limited
Van Vleck, Mike, CAPT	Captain, US Merchant Marine

Appendix A – Attendees (Continued)

Wang, Joe, Mr.	Political Officer, US Department of State
Weis, William, Dr.	Task Force Climate Change, Naval Undersea Warfare Center
Wilson, Brian, Mr.	Deputy Director, MOTR, US Coast Guard
Wright, David, Dr.	Associate Professor, University of Calgary
Young, Randy, Mr.	Strategic Trade Assessments Senior Analyst, Office of Naval Intel
Zysk, Katarzyna, Dr.	Senior Fellow, US Naval War College

Appendix B - Schedule of Events

7-9 December 2010

TUESDAY, 07 DEC

0800 – 1700 Travel

1700 – 2000 Registration and social at Newport Marriott

WEDNESDAY, 08 DEC

0645 – 0715 Shuttles vans pick-up participants at Newport Marriott/drop off NWC McCarty Little Hall

0700 – 0745 Late Registration in McCarty Little Hall lobby

0700 – 0745 Breakfast in McCarty Little Hall cafe

0800 – 0830 Opening Remarks by Admiral Roughead, Chief of Naval Operations - Auditorium

0830 – 0845 Administrative Remarks and Game Brief – Auditorium (Prof Ducharme)

0845 – 0915 Panama Canal Expansion Brief – Auditorium (Mr. Randy Young)

0915 – 0945 Arctic Opening Brief – Auditorium (Mr. Zachary Hamilla)

0945 – 1000 Break

1000 – 1015 Law of the Sea Brief – Auditorium (CDR James Kraska)

1015 – 1030 Ports Overview Brief – Auditorium (Mr. Gary Gilbert)

1030 – 1130 Move 1 Activities – Game Cells

1130 – 1230 Lunch – McCarty Little Hall cafe

1230 – 1430 Move 1 Activities continued – Game Cells

1430 – 1445 Break

1445 – 1600 Scenario Plenary Sessions – Decision Support Cell (DSC) and Auditorium

1600 – 1800 Free time (Shuttle vans to/from Newport Marriott as necessary)

1800 – 2030 Keynote Address and Dinner at the Officers' Club – Speaker TBD

2030 – 2100 Shuttle vans to Newport Marriott

Appendix B - Schedule of Events (Continued)

THURSDAY, 09 DEC

- 0645 – 0715 Shuttles vans pick-up participants at Newport Marriott/drop off NWC McCarty Little Hall
- 0700 – 0800 Breakfast in McCarty Little Hall cafe
- 0800 – 1000 Move 2 Activities – Game Cells
- 1000 – 1015 Break
- 1015 – 1100 Move 2 Activities continued – Game Cells
- 1100 – 1200 Scenario Plenary Sessions – Decision Support Cell (DSC) and Auditorium
- 1200 – 1330 Lunch – McCarty Little Hall café / Free Time / Naval War College Museum Tours as desired
- 1330 – 1415 Final Outbrief Preparation – Game Cells
- 1415 – 1430 Break
- 1430 – 1600 Final Combined Plenary / Outbrief – Auditorium
- 1600 – Shuttle vans to Newport Marriott / Travel

Appendix C – Knowledge Management Strategy

1. Game Dates: 08-09 Dec 2010
 - a. Alpha Test Date: 17-18 Nov 2010
2. **Description:** Two day game directed by CNO to explore strategic implications of future shipping pattern changes
3. Game Cells:
 - The player game cells will be 207/207A, 211/211A, 236/237, 241/241A
 - Plenary sessions will be in the DSC or MLH auditorium
 - Control will be in 110W
4. Game Cell Manning: 1xModerator, 1xTechnographer, 1xEthnographer
5. In Cell Control Computer hardware requirements:
 - a. 1 x Technographer (Projection to all 4 screens potentially)
 - b. 1 x Ethnographer (B/U Projection to all 4 screens potentially)
 - c. 1x Reference Projection (Projection to all 4 screens potentially)
 - d. 18 x Player Computers
 - Game Tech request e-mail's should be sent to the _WGD-GT e-mail collective
6. Game net Folder Structure:
 - Panama Canal Cell1
 - o Panama Canal
 - o Technographer
 - Panama Canal Cell2
 - o Panama Canal
 - o Technographer
 - Arctic Cell1
 - o Arctic
 - o Technographer
 - Arctic Cell2
 - o Arctic
 - o Technographer

Appendix C – Knowledge Management Strategy (Continued)

- Player Reference Files
 - Arctic
 - Panama Canal
 - Overarching Documents
- Control
 - Analysis
 - Panama Canal
 - Ethnographer Notes
 - Panama Canal Cell 1
 - Panama Canal Cell 2
 - Arctic Cell 1
 - Arctic Cell 2
 - Technographer Products (Cell Deliverables)
 - WebIQ Files
 - Arctic Routes
 - Ethnographer Notes
 - Technographer Products (Cell Deliverables)
 - WebIQ Files
 - Game Director Files
 - Transfer to CNET Files
 - Uploaded from CNET Files
 - Final Analysis Copies of Files_Analysis Team ONLY

7. Audio Visual Aids:

- a. Projection

8. Web Development

- a. Surveys (During game play)
 - DSC Staff (MLH)
- b. Game Website on internet
 - Mr. Colin Osborne (MLH 340)

Appendix C – Knowledge Management Strategy (Continued)

9. Collaborative Capabilities (Players)

- a. Face to Face Only

10. Collaborative Capabilities (Control/White Cell)

- a. Phone Internal
- b. Email Gamenet
- c. Email External
- d. Internet Access

11. Game Facilitation Requirements

- a. Maps of Panama Canal region and several successive increases in scope for player reference and use in cell deliverable
- b. Maps of Arctic Ocean region and several successive increased in scope for player reference and use in cell deliverable
- c. Ethnographer Template
- d. Technographer Template

12. Pregame Preparations on First Day

- a. KM reps walk through game cells with audiovisual reps to verify all projectors are appropriately slaved to designated screens.
- b. All control and player computers checked for ensure operational.

13. Game Process

- a. First day
 - Cell participants focus on their specific area of expertise to discuss implications of new dimensions of Panama Canal widening and opening of the Arctic
 - 1. Products
 - a. Ethnographer Notes
 - b. i2 Analysts Notebook Charts

Appendix C – Knowledge Management Strategy (Continued)

- c. List of Implications that discuss changes to current situation
 - d. Recommendations
- Cell participants move to auditorium/DSC to discuss implications across areas of expertise. Plenary sessions are either focused on Panama Canal Expansion or Opening of the Arctic.
 - 1. Products
 - a. Ethnographer Notes
 - b. i2 Analysts Notebook Charts
 - c. List of Implications that discuss changes to current situation
 - d. Recommendations
- b. Second day - cell participants focus on their specific area of expertise to discuss implications of Panama Canal expansion or opening of the Arctic.
 - 1. Products
 - a. Ethnographer Notes
 - b. List of Implications that discuss changes to current situation
 - c. Recommendations
- Cell participants move to auditorium/DSC to discuss implications across areas of expertise regarding either Panama Canal Expansion or Opening of the Arctic
 - 1. Products
 - a. Ethnographer Notes
 - b. List of Implications that discuss changes to current situation
 - c. Recommendations
- Cells return to individual cells for more SME discussion
 - 1. Products
 - a. Ethnographer Notes

Appendix C – Knowledge Management Strategy (Continued)

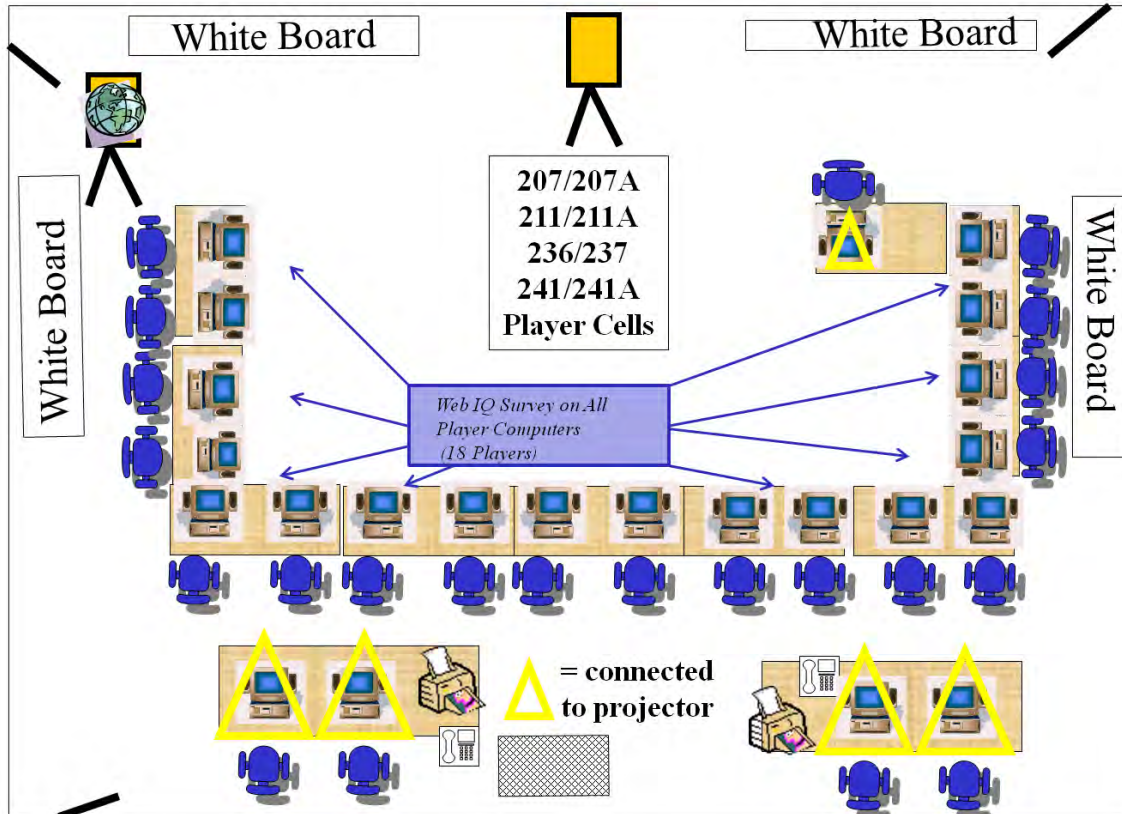
- b. List of Implications that discuss changes to current situation
 - c. Recommendations
- Cell participants move to auditorium for final outbrief plenary.
 - 1. Products
 - a. Ethnographer Notes
 - b. Recommendations

14. Analysis Tools



- a. Collection
 - I2 Analyst Notebook
 - Ethnographer Notes
 - 1. Method of collection
 - a. Ethnographer types directly into i2 Analysts Notebook in card selection for pre-designated entity created for their cell
 - b. Backup plan is to populate pre-formatted Word documents in the event of technical difficulty with Analyst Notebook
 - Technographer Deliverable
 - 1. Method of collection
 - a. Pre-formatted PowerPoint presentation that will be dumped into i2 Analysts Notebook and i2 Text Chart
 - End of move surveys
- b. Analysis
 - i2 Analysts Notebook
 - 1. Technographers from each cell will populate either the Arctic or Panama Canal charts. These will be combined during post game analysis in support of analysis efforts.
 - i2 Text chart

Appendix C – Knowledge Management Strategy (Continued)

Game Cell Layout



Appendix D – Post-move Plenary Slides






Panama Canal Cell A – Move 1

Economic

Implications:

- East Coast ports are incapable of handling >\$k TEU ships.
- West coast ports are nearing capacity.
- Norfolk and Halifax are only viable East coast ports for > \$k TEU ships.
- Port productivity (blts per hour) is not competitive with international standard.
- Retailers have diversified distribution centers to reduce risk associated with single port operations (resulting from LALA lockout and meltdown of US rail system).
- Rail/highway infrastructure needs to keep pace with growth.
- Two responses to run coastal shipping (Jones Act, HMT, Labor Handling Cost and Crew Requirements).
- China's dramatically investing in transportation and infrastructure improvements.
- Increased into China market demand may affect overseas trade.






Panama Canal Cell A – Move 1

Political

Assumptions

- 1-2 ports will be dredged and some supporting infrastructure will be in place to accommodate a >\$k TEU ship.
- China to increase investment in Latin America, South Am. and Africa.
- Cuba has opportunities for increased use.
- Bulk exports moving through the canal from the east coast to Asia will increase.
- US government and stake holders will be very aggressive in resolving threats to the Panama canal.
- Jones Act will remain intact.






Panama Canal Cell A – Move 1

Economic

Assumptions

- BRIC (+10 for tech) will continue to grow and CIVETS will be an emerging market.
- Carriers must call on multiple East coast ports (with suitable infrastructure) to be economically viable.
- Transshipment option – Retailers may not tolerate increased transit time, handling cost and increased inventory cost due to lower inventories and just-in-time overhead.
- China to US east coast / US heartland - Quicker to use land bridge (24-25 days vs. 48 days).
- US Railroads will continue to invest to maintain to increase capacity (2010- \$5B in infrastructure improvements).
- Line from Chicago west is serviced by West coast ports.
- Panama Canal tariffs will rise but still manageable.






Panama Canal Cell A – Move 1

Political

Assumptions

- 1-2 ports will be dredged and some supporting infrastructure will be in place to accommodate a >\$k TEU ship.
- China to increase investment in Latin America, South Am. and Africa.
- Cuba has opportunities for increased use.
- Bulk exports moving through the canal from the east coast to Asia will increase.
- US government and stake holders will be very aggressive in resolving threats to the Panama canal.
- Jones Act will remain intact.






Panama Canal Cell A – Move 1

Political

Implications

- Army Corps of Engineers will play a vital role in selection of ports to dredge which results in infrastructure investments and economic opportunities for "winning" ports.
- Stability of Panamanian Government is critical.
- Autonomy of the Panama canal authority is crucial.
- Larger number of countries will want to protect Panama Canal.
- Significant funds needed to pay for dredging and highways.
- Advancement of US Domestic shipping will require political engagement (i.e. Jones Act, US Crew requirements, HMT).
- Increased climate change will accelerate carbon tax fees resulting in more competitive US manufacturing.

Panama Canal Cell A – Move 1

Infrastructure



Implications

- China investing heavily in Africa.
- Diversification of production and consumption from China to BRIC/CIVETS states is dependant on internal infrastructure upgrades.
- US Highway trust fund and harbor maintenance fund will need to be funded to keep up with demand on ports and highways.

Assumptions

- China will continue to invest in port and land infrastructure.
- Highway constraints: environmental, safety, funding, driver shortage.
- Infrastructure assumptions stated in economic slides.

Appendix D – Post-move Plenary Slides (continued)

Panama Canal Cell B – Move 1



Economic

Implications:

- Long distance (South America to Europe) is more expensive than short distance (Europe to Asia)
- Increased competition for cargo ships
- Changes in shipping routes will be noticed

Assumptions:

- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand

Panama Canal Cell B – Move 1



Information

Implications:

- Supply must be "flexible" based on ability to predict disruptions
- Security must be "flexible" due to increase in volume

Assumptions:

- Information underpins the ability to operate just in time logistics and security
- Also underpins ability to maintain MVA

Panama Canal Cell B – Move 1



Infrastructure

Implications:

- For security reasons, it will ensure vulnerability relative to capacity regardless of capacity
- Growth of trans-shipment ports

Assumptions:

- Certain ports limited expansion capabilities even with investment
- Panama problematic due to climate

Panama Canal Cell B – Move 1



Social

Implications:

- Crime and instability reduces appeal and can push potential growth elsewhere
- Technical evolution of production decreases shipping requirements (reduce)
- Shift in consumption and manufacturing centers
- Population migration results in movement in non-sterile locations (e.g. Canada)

Assumptions:

- Chinese middle-class growth will play a role in increasing demand and increasing use of Chinese exports
- African economic development increases a player
- Global warming

Panama Canal Cell B – Move 1



Political

Implications:

- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships

Assumptions:

- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand

Panama Canal Cell B – Move 1

Military/Security

Implications:

- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships
- Increased competition for cargo ships

Assumptions:

- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand
- Shipping companies will continue to expand

Appendix D – Post-move Plenary Slides (continued)




Arctic Cell C – Move 1

Economic

Energy

- Implication: Global Economy will drive economic viability of Arctic
- Assumption – Global Energy Demand will rise and will make it economically beneficial to exploit energy resources in the Arctic
 - Oil and gas remaining efficient requirements drive new sources of energy

Fishing

- Implication: Increase conflict? Possible Moratorium in Arctic
- Assumption – Fishing stock increases and shifting in Arctic and location is unknown




Arctic Cell C – Move 1



Infrastructure

Implication

- Technologically Feasible but very costly
- Cost will be offset if economic benefits of Arctic shipping and energy extraction reach X level of profitability
- Cost of services (salvage, piloting, SAR) and air search fees may determine viability of economic activity
- Private companies will help drive infrastructure but purely private companies may be at a disadvantage to government-owned or directed industry

Assumptions – Infrastructure Required for Economic Viability of Arctic

- Port Development and International System Development
- Charting, Weather Forecasting
- Salvage, Waste Management, Classes of Iceberg
- Government – Military, SAR, etc.

Arctic Cell C – Move 1



Economic

Other Economic Opportunities

- Implication: Fresh Water and Minerals
- Example – Canada and Russia Island
- Assumption – Infrastructure and technology will make it economically viable to extract and ship to consumers outside Arctic Regions Shipping

Shipping Requirements Increase for Gas/LNG

- Implication: Arctic Shipping Increase will require degradation not halted
- Assumption – Degrading degradation in Arctic Region (Russia, Alaska) will require serious repair or replacement



Arctic Cell C – Move 1

Political

Implication: Both big dynamics in Arctic State holder makeup and relationship

Assumptions:

- International Seabed Authority will play a role
- Role of Commission on the Limits of the Continental Shelf
- EU growing influence
- Arctic Council seeks to extend Area of Influence authority
- Enhanced Governance in Arctic region
- We don't even know who the actors will be in the process

Arctic Cell C – Move 1



Economic

China

- Implication – Potential beneficiary of Arctic Economic Activity
 - Customer of Arctic shipping and potentially energy resources extracted from Arctic
 - Gain competitive advantage over India
- Assumption
 - Chinese find method to gain ownership of Arctic oil and assets without resistance of other stakeholders

Russia

- Implication – Large beneficiary to economic opportunities
- Assumption –
 - Needs to overcome technology/infrastructure lagging
 - Reflected diversified economic growth

Arctic Cell C – Move 1

Political

Implication: Common standards (IMO) will drive for common shipping policy

Assumption: Common regulations for ships, environmental, etc. will be cooperatively agreed upon via Polar Code

Implication: UNCLOS will/will not affect US credibility in Arctic issues



Assumption

- US is increasingly losing influence in Arctic region forums
- OR US influence is not severely degraded by lack of ratification

Assumption: Confusion having ratified – example – older states not deterred from walking away from UNCLOS

Assumption: Political personalities will continue to block US ratification

Appendix D – Post-move Plenary Slides (continued)






Arctic Cell D – Move 1

Economic

Implications

- Increase in # of transits (assumption), increases risks, thereby increasing demand for investment in infrastructure and problem response
- If economic investment is to increase, adequate viable scientific research products will be desired.
- Some countries may drive infrastructure improvements in a geo-strategic manner so that private companies can benefit and increase activity.
- Opening passage could possibly lead to diminished US political and economic power (Stronger Europe to Asia ties)
 - U.S. non-ratification of UNCLOS
- Barring economic catalyst, changes will remain marginal

Arctic Cell D – Move 1



Political

Implications

- China's power is based on economic activity. China will be very interested in exploiting changes. Why is China so interested?
- With large oil discoveries, Greenland could work toward independence. Less EU influence.

Assumptions

- Very closely tied to economic activity.
- Sovereignty and boundary disputes will be peaceably resolved.
- Political discussions are ongoing and will be happening in future.
- Indigenous people will be key political players in the future. Influence over development will continue.
- Russia will continue to be a leader in Arctic for research and political discussion
- Arctic Council may expand to absorb other parties interested in the Arctic






Arctic Cell D – Move 1

Economic

Assumptions

- Shipping activity of all sorts will significantly increase
- Resource exploitation could be a major driver
- Cost, Risk and Accessibility will limit investment in Arctic up to 2035.
- U.S. discretionary spending will be similar to how it is today.
- US Arctic industry will continue to need to move things to/from Arctic areas.

Arctic Cell D – Move 1

Infrastructure

Implications

- Arctic development will drive infrastructure
- Infrastructure for Arctic development will be dual use and support increased trans-shipment through the Arctic

Assumptions

- Research, surveys and mapping are slowly and incrementally underway. In 2035 we will have a useful amount of this information to support navigation of Arctic.
- Strategic / Sovereignty will likely be the lead reason to increase govt. investment in Arctic
- Infrastructure in arctic is not building rapidly and likely won't at a faster rate between now and 2035.
- Energy prices remain stable
- Infrastructure creation likely to be tied to environmental protection.
- No major technological advances


Appendix D – Post-move Plenary Slides (continued)

 Global Shipping Game
Move 2
Panama Canal Cells 2020


The following is (is contained) within the presentation (will occur) by the Naval War College, to provide a framework for the discussion of the strategic implications of Panama Canal instability. The following is (is contained) within the presentation (will occur) by the Naval War College, to provide a framework for the discussion of the strategic implications of Panama Canal instability.

 Global Shipping Game
Move 2 Update
Panama Canal Cells 2020

- Jones Act Modified
- Panama Instability leads to inconsistent passage through the canal
- Environmental disaster
- Substantial "Carbon Tax" added to fossil fuel usage
- China Exports decrease significantly through a variety of means (i.e. internal consumption, etc)
- Multiple terrorists attacks in the Red Sea results in 100% ship inspection prior to Suez Canal transit.
- 20% Loss of All West Coast Port operations
- Information systems deemed unreliable

 Global Shipping Game
Move 2 Changes
Panama Canal Cells 2020

- Jones Act Modified
Changed Implications – Only relevant if shippers would hub and spoke (i.e. single port that can handle a >\$1 TEU vessel) a large ship containers throughout the US
New Implications:
 - More relevant in conjunction with a rise in fuel prices or "carbon tax" given that over sea transport is currently the most fuel efficient
 - The issue is larger than the Jones Act (i.e. harbor maintenance tax, labor issues, construction costs, etc.). Too many other issues that combine with the Jones Act to raise the cost of short sea shipping so that it is not economically viable
 - Need to analyze Europe and other countries Cabotage and Short Sea Shipping methods

 Global Shipping Game
Move 2 Changes
Panama Canal Cells 2020

- Panama Instability leads to inconsistent passage through the canal
Changed Implications – Smaller inventories and diversified distro points would be pushed up to handle change in regular resupply
New Implications:
 - Short Term: Some cargo will be diverted to other ports
 - Some ships will wait for opening of the canal (no more than 1-2 days)
 - Significant rate increases
 - Long Term: Alternate route will reach capacity quickly due to port capability and/or infrastructure limitations

 Global Shipping Game
Move 2 Changes
Panama Canal Cells 2020

- Environmental disaster
Changed Implications –
New Implications:
 - Similar to Instability

 Global Shipping Game
Move 2 Changes
Panama Canal Cells 2020

- Substantial "Carbon Tax" added to fossil fuel usage
Changed Implications – Destination service line (currently east of Chicago down to abt Atlanta) from either the East or West coast will most likely move westerly
New Implications:
 - Emissions efficiency will drive the raising of goods
 - Slow steaming raises efficiency but causes the addition of ships in the 1990s
 - At some tipping point manufacturing will need to move closer to destination
 - At some point service would be discontinued
 - Competition should drive fuel efficiency technology advances
 - Larger ships would be built

Appendix D – Post-move Plenary Slides (continued)


 **Global Shipping Game**
Move 2 Changes
Panama Canal Cells 2020

- China Exports decrease significantly through a variety of means (i.e. internal consumption, etc)

Changed Implications –

New Implications:

- Counterpoint: Internal consumption of food and medicine makes exports more stable and consistent
- Counterpoint: Manipulating oil prices would move resources away from the coastal region
- Counterpoint: Little evidence that China exports would decrease; balance of trade may not improve


 **Global Shipping Game**
Move 2 Changes
Panama Canal Cells 2020

- Multiple terrorists attacks in the Red Sea results in 100% ship inspection prior to Suez Canal transit.

Changed Implications – None

New Implications:

- Minimum 6 hours in port at canal/Red Sea port
- Disruption to the Red Sea will increase cost to the shipping line
- Long lines
- Potential changes

 **Global Shipping Game**
Move 2 Changes
Panama Canal Cells 2020


- 20% Loss of All West Coast Port operations

Changed Implications:

- Shipments will be diverted to include Canada and Mexico. Retailers will request diversion point to better set-up for distribution
- Distribution line will be forced to the West if more diverted traffic lands on the East Coast

New Implications:

- Intermodal problems with handling diverted traffic
- Potential for port operations hours shifts to make-up for loss
- There is legislation in place for the Government to force the end of a labor dispute, however, the Government would be highly reluctant to utilize it.
- Underutilized Gulf Coast ports may become more cost effective (intermodal has limited capacity)
- Container movements with exports or domestic freight will be complicated with diversionary ports

 **Global Shipping Game**
Move 2 Changes
Panama Canal Cells 2020

- Information systems deemed unreliable

Changed Implications –

New Implications:

- Containers would slow down
- Shipping schedule would slow and not full
- Potential increased security measures in port areas

Appendix D – Post-move Plenary Slides (continued)

Arctic Cell C – Move 2

Arctic Cells 2035 (Energy Exploitation)

- The United States has not ratified UNCLOS
- Key Arctic, Caribbean and Southeast Asian states are threatening withdrawal
- Implications:
 - Arctic in Conflict – US ability as mediator
 - Rule of Law becomes weaker
 - Policy in Favor of China
 - Draws into question the legal status of the Arctic

Arctic Cell C – Move 2

Arctic Cells 2035 (Energy Exploitation)

- The United States has not ratified UNCLOS
- Key Arctic, Caribbean and Southeast Asian states are threatening withdrawal
- In 2025, China begins massive financial investments in Arctic oil extraction efforts
- Implications:
 - China
 - China Investment Impacts
 - Direct investment to high other parties
 - Builds capacity to support investment
 - Builds excess capacity now will not need extra resources in the future
 - 2035- the world's leading oil producer
 - Already building bigger oil rigs or be breaker
 - US not ratified UNCLOS is the best possible scenario for China
 - Not necessarily a bad thing, bring China to the table become part of the Arctic Council
 - China takes a lead on UNCLOS and negotiates for favorable

Arctic Cell C – Move 2

Arctic Cells 2035 (Energy Exploitation)

- The United States has not ratified UNCLOS
- Key Arctic, Caribbean and Southeast Asian states are threatening withdrawal
- In 2025, China begins massive financial investments in Arctic oil extraction efforts
- Technological advance improve economics of Arctic oil extraction during increased exploration and exploitation of oil resources
- In 2025, a large oil and gas extraction platform exploded creating an uncontrolled oil discharge, Oil pollution extended along the U.S. Atlantic Seaboard and the European Atlantic/North Sea coast
- Implications:
 - No matter what happens, oil will still be extracted, we will react to the environmental threat will still move on
 - Demand will drive toward maximum extraction without regard to environment
 - May drive significant increase in regulation
 - Potential – Greenland becomes independent and severely impacted
 - Collapsed nation extreme cold disruption
 - Oil new reliance on oil will drive return to production
 - Arctic are Region Local Dependent i.e. Alaska keep pushing for oil despite what the rest of the country feels about it

Arctic Cell C – Move 2

Arctic Cells 2035 (Energy Exploitation)

- The United States has not ratified UNCLOS
- Key Arctic, Caribbean and Southeast Asian states are threatening withdrawal
- In 2025, China begins massive financial investments in Arctic oil extraction efforts
- Implications:
 - Russia
 - May instigate a response to Chinese influence
 - Cooperation formulation possible with China

Arctic Cell C – Move 2

Arctic Cells 2035 (Energy Exploitation)



- The United States has not ratified UNCLOS
- Key Arctic, Caribbean and Southeast Asian states are threatening withdrawal
- In 2025, China begins massive financial investments in Arctic oil extraction efforts
- Technological advance improve economics of Arctic oil extraction during increased exploration and exploitation of oil resources
- In 2025, a large oil and gas extraction platform exploded creating an uncontrolled oil discharge, Oil pollution extended along the U.S. Atlantic Seaboard and the European Atlantic/North Sea coast
- Implications:
 - Russian and Norwegian GHP highly decided by Oil and Gas but will have the technology to clean the environment like we haven't seen, a false-compl. We should plan and expect this to happen.
 - Depends on whose flag it was –
 - A private company with limited liability disaster – depends on size
 - Or government controlled entity
 - Will drive R&D to other energy sources? dramatic increase in other technologies
 - Mitigation – Arctic Council may have problem replace by 2025 to deal with disaster & R&D new technology make increase mitigation capabilities
 - No history – no risk assessment – could be problematic for insurance
 - Some say response preparations lag – others say private industry building infrastructure to have quick response

Arctic Cell C – Move 2

Arctic Cells 2035 (Fisheries)

- The United States has not ratified UNCLOS
- Risk shifts worldwide outside of the Arctic region have collapsed
- An Arctic coastal state interpret approved extended continental shelf claims to be equivalent to an EEZ. This state declare this area off limits to fishing by other nations claiming all fish caught in these waters
- Implications:
 - Differing viewpoints
 - This may be a no-no because of agreements in place today
 - There is no conservation management in place in the Arctic
 - Will see conflict starting small and possible spreading – already witnessed
 - Issues with IUU vessels (rogue actors) there will be a significant IUU presence and enforcement will be necessary but US does not have the capacity to enforce (presence and MDA)
 - Increasing/free states need to protect the EEZ's support the zones
 - Legally debatable?
 - Increase in security issues and Freedom of Navigation issues
 - Experience – some good at protecting the BLMs
 - Arctic Council provide regional agreements in security awareness
 - Possible Chinese influence through financial backing of Arctic activities/initiatives



Appendix D – Post-move Plenary Slides (continued)

Arctic Cell C – Move 2

Arctic Cells 2035 (Fisheries)



- The United States has not ratified UNCLOS
- First Arctic worldwide outside of the Arctic region have collapsed
- Sea Arctic coastal state interprets approved continental shelf claims to be equivalent to an EEZ. This state declares that area off limits to fishing by other nations claiming all fish caught in those waters
- Implications:
 - Institute Marine Spatial Planning
 - Arctic Domain Awareness is imperative for resource management (is more than a security tool but management tool with leadership from the Arctic Council)
 - Some do not think it will work...many arguments and impediments as seen in Maritime domain awareness discussions, i.e. what info to share.
 - Russia is installing Arctic Satellite system
 - US should take the lead in domain awareness...with leveraging technology amongst all interested parties
 - This is an IMO issue that is already being addressed
 - Arctic Council provide regional agreements in security/awareness
 - The AC need to be more robust as an official body with a secretariat with possible China financing – Consensus?

Arctic Cell C – Move 2

Arctic Cells 2035 (Protectionism/Commercialism)

- The United States has not ratified UNCLOS
- Arctic Council states divide into factions: one favoring commercial development (charges exorbitant transit fees) and the other initiating protectionist policies (denies transit/shipping/energy exploitation)
- Implications:
 - These will fall under trade issues
 - May not be plausible because states do both
 - Key is the makeup of 2035 Arctic Council
 - The big deal is the denial of transit, could spark FOI issues
 - Arctic Council Authorities Versus State Responsibilities
 - US position may be eroded to argue/disagree with AC states

Arctic Cell C – Move 2

Arctic Cells 2035 (Dholak Point/SLOC Impediment)

- The United States has not ratified UNCLOS
- Multiple terrorist attacks in the Red Sea results in 100% ship inspection prior to Suez Canal transit
- Implications:
 - Can't have complete ice-free Arctic – seasonal – no impact
 - Great ships and Arctic ships are not compatible – no impact
 - May spur investments to change the flow of shipping patterns (i.e. economy)
 - Impacts for the growth of Arctic ship building
 - If this happened to Panama may be a significant impact
 - Short term problem – the longer the state, the more significant the impact on long term shipping patterns
 - Potentially capable that if Russia/Norway/other states provide big territorial claims shipping through Arctic




Other Thoughts

- Need for Common Terminology: i.e. trans-arctic, destination, Safety as well as other Standards will be Critical (ship construction)
- Flagging of ships for Safety or for Money?
- Security Challenges –
 - US not in a position to deal with Arctic Conflict
 - US cannot afford to build ships for Arctic cannot afford to fall behind
 - US is not in a position of leadership in the Arctic
 - Diplomatically US is still considered a potential powerful player in most Arctic discussions.
- Rules / New Laws i.e. Canadian regulations = cannot be enforced (lack capacity)

Appendix E - Final Plenary - Group Outbriefs

Panama Canal Group A – Key Insights

The Panama Canal is a critical node of transportation that must remain open

The CNO cares because...

- Commercial business looks to the Navy to ensure that there are secure supply chains especially in the maritime environment;
- The security environment in Panama is critical.

Gradual changes in global shipping patterns after the expansion of the canal – no sudden changes

The CNO cares because...

- The maritime security environment will not change overnight.

Port Readiness – East coast ports will not be prepared to accommodate the >8k TEU ships, from a draft and infrastructure standpoint, by the opening of the canal. Several Caribbean and Latin American ports are further developed via international funding (i.e. China in Venezuela)

The CNO cares because...

- Gradual change in shipping patterns;
- Transshipment increasing security risks.

North – South trade expansion

The CNO cares because...

- Change in shipping patterns and security challenges

The commercial industry will find a way to get products to the customer through whatever means available

The CNO cares because...

- Shippers and retailers will set the routes based on cost analysis.

Global economy is dependent on a secure information network

The CNO cares because...

- Investment in cyber and environmental analysis is paramount.

Panama Canal Group B – Key Insights

Security in Panama Canal Zone is not a concern. Industry will survive.

The CNO cares because...

- There are more important things to be concerned about

Further analysis of evolving threats and how information sharing (MDA) between nations and propose comprehensive international standards.

The CNO cares because...

- Threats evolve and as they evolve a unified international standard will help to counter them.

Influence government to do comprehensive study of supply chain priorities.

The CNO cares because...

- Expansion has significant infrastructure implications can only be done at federal level (in progress).

Influence political aspect of port infrastructure development / capabilities and subsequent intermodal support functions.

The CNO cares because...

- Impact on both domestic and global economies.

Sponsor Re-evaluate / revise Jones Act

The CNO cares because...

- Relates to strategic lift responsibility.

Expanded regional exercise and planning.

The CNO cares because...

- It is important to be prepared. As region grows in importance, so increases the need for regional partnerships and experience.

*Avoid temptations to overreact unilaterally when driven by political concerns.
“Don’t use the card”*

The CNO cares because...

- Damage to industry;
- Backlash will be significant.

Arctic Group C – Key Insights

Why the Arctic Matters

- Arctic linked to Global Economy
 - Arctic Regional Economic Opportunities (Fishing, Energy, etc.)
 - No Significant Impact on Worldwide Trade (Container Ships)
- Strategic implications are too significant to ignore

US Strategic Relevance

- UNCLOS Ratification is Essential to US Influence
- Plan for Game Changers
- Increase Cooperation and Dialogue
- Arctic Peace Through Regional Partnerships
- Plan to Support US Coast Guard Missions

- US Remains Influential and Effective World Power
- US is an Arctic Nation
- US Arctic Strategic Relevance is becoming akin to Arctic Ice
- Arctic Security Leadership
- Persistent Sovereign Presence reserves Future Options
- US Arctic Strategic Relevance is becoming akin to Arctic Ice

Preparedness

- Anticipate a Different Arctic
- Arctic Linked to Global Economy
- Plan to support US Coast Guard Missions
- US ins an Arctic nation
- Develop personnel expertise and effort
- Must understand physical environment
- Arctic Security leadership
- Increase Arctic Awareness and Engagement
- Advanced Robotic Systems
- Invest in MDA
- Arctic Expansion present Unknown Risk

Budget/Tradeoffs

- Plan to Support US Coast Guard Missions
- US is an Arctic Nation
- Advanced Robotics

- Invest in Arctic Domain Awareness
- Arctic Expansion Presents Unknown Risk
- Plan Future Shipping Technology Today

Leadership

- Craft the Right Message
- Increase Cooperation and Dialogue
- Arctic Peace through Regional Partnerships
- Persistent Sovereign Presence preserves future options
- UNCLOS Ratification
- Plan to Support Coast Guard Missions
- US remains an effective and influential world power
- US is an Arctic Nation
- US Arctic Strategic Relevance is becoming akin to Arctic Ice
- Arctic Security Leadership
- Lead Arctic Endeavors
- Increase Arctic Awareness and Engagement – Domestic and International

Arctic Group D – Key Insights

UNCLOS needs to be ratified; because it advances US national security interests

Many variables (economic, environmental, political) lead to uncertainty.

Despite climate change and business opportunities, arctic passages have a low probability to become new “Panama Canals” according to future intentions of the shipping industry. An increase of destination traffic will happen but will be small compared to global traffic and gradual.

The CNO cares because...

- The US is an Arctic nation;
- Need collective approach to address Arctic issues (vice unilateral);
- The ambiguity of Arctic governance;
- With scant resources and funds, USN activity in Arctic presents opportunity to shape future operating space;
- Not preparing for climate change (long lead-time items: shipbuilding, training, and infrastructure) will present a lost opportunity for US;
- Arctic can be viewed as a maritime avenue of approach to North America;
- Year-round surface capability required (USN & USCG);
- Multiple potential threats.

Appendix F – Scene Setter Planning Factors

Panama Canal Cells 2020 - Move 1 Planning Factors/Assumptions

(The planning factors contained within this presentation were developed by the Naval War College to provide a framework for discussion of the strategic implications of Panama Canal expansion. These planning factors, while plausible, are not meant to be predictive.)

- Expanded Panama Canal opened for business in 2014 in accordance with projections and became fully operational shortly thereafter
 - Since opening there has been no significant or long-term degradation in service
- Regional states and the Panama Canal Authority remain committed to constructive dialogue on issues affecting the region and its commercial viability
- Worldwide economic conditions are relatively stable
 - GDP of the G20 continues to grow at an average of 3.5% per annum
 - BRIC nations continue to outpace the rest of the world.
- The price of marine grade diesel fuel continues to rise but within historical averages and in line with predictions
- All strategic chokepoints and sea lanes remain open to free transit
- There have been no significant disasters involving large-scale loss of life or environmental catastrophes in the Panama Canal region
- U.S. continues to abide by most provisions of UNCLOS but has yet to ratify the treaty
- Jones Act has not been modified or repealed

Appendix F – Scene Setter Planning Factors (cont...)

Arctic Cells 2035 - Move 1 Planning Factors/Assumptions

(The planning factors contained within this presentation were developed by the Naval War College to provide a framework for discussion of the strategic implications of Panama Canal expansion. These planning factors, while plausible, are not meant to be predictive.)

- Worldwide economic conditions are relatively stable
 - GDP of the G20 continues to grow at an average of 3.5% per annum
 - BRIC nations continue to outpace the rest of the world
- The price of marine grade diesel fuel continues to rise but within historical averages and in line with predictions
- U.S. continues to abide by most provisions of UNCLOS but has yet to ratify the treaty
- Jones Act has not been modified or repealed
- All strategic chokepoints and sea lanes outside of the Arctic remain open to free transit in 2035
- There have been no significant disasters involving large-scale loss of life or environmental catastrophes in the Arctic region
- Arctic states remain committed to constructive dialogue on issues affecting the region and its commercial viability
- Ice conditions pertaining to Arctic shipping in 2035
 - Northern Sea Route offers possible transit for approximately 120 days a year, using ice-hardened ships, with about 60 days easily navigable
 - Northwest Passage is open for episodic use 50-60 days a year, with 20-30 days of easy passage
 - Amount of multi-year drifting ice has decreased considerably but still requires navigational consideration and periodic delays
 - Windblown ice, fog, storms, and superstructure icing remain as hazards even in open water
 - Transit across the Central Arctic Ocean is possible with an icebreaker or ice-hardened vessel, and is expected to be routinely viable within the next 5 years

Appendix G - Survey Questions

Player Background Survey

Instructions: WHY IS THIS SURVEY IMPORTANT? Establishing a baseline of player experience and expertise is an important element of the post-game analysis for this project. Accordingly, your candid responses are essential. Please note that all responses will be safeguarded in accordance with Naval War College, War Gaming Department procedures. If you have any questions, please feel free to speak with the Lead for the game's Data Collection & Analysis Team.

Demographics:

1. Player Name:
2. Company Name, Organization or Branch of Service:
3. Title (or Rank if Military/Retired or Government):
4. Industry Specialty or Designator, Military Occupation Specialty (if Military/Government):
5. Total Years of Industry or Agency Service:
6. Please indicate your gender:
7. Please indicate your age:
8. Highest level of Education completed:
9. What areas of expertise do you bring that are applicable to this game?

For the purposes of this game, the following terms and definitions will be used:

Political Activity (PA): Actions undertaken by members, affiliations, or parties vested with authority who possess a common set of interests, concerns, and goals.

Economic Activity (EA): The production, distribution, and consumption of goods and services to or for a given population.

Social Activity (SA): Actions designed to better understand a society's culture and its norms.

Infrastructure Activity (IA): Actions involving transportation, power generation, communications, banking, and health.

Information Systems Activity (ISA): Efforts to collect, process, store, transmit, display, disseminate, and act on information.

Military Activity (MA): The use of State-sponsored armies, navies, or national militias possessing the capability to conduct both offensive and defensive operations.

Note: Questions #10-14 below are based on a Likert scale, which includes the following values:

Strongly Agree, Agree No Opinion or Don't Know, Disagree, Strongly Disagree

10. Based on the information provided in the background presentations and the scene setter planning factors, I will be able to significantly contribute to the game's discussions and activities.

11. Based on the terms presented, I believe that my experience working in one or more of these areas will prove valuable in examining changes in global shipping patterns and the flow of goods that will be discussed.

12. When working in a team environment, I tend to assume a leadership role.

13. When making difficult decisions, I rely on my experience more than analyzing available data.

14. When making decisions, I rely on instinct rather than analysis.

Ranking of Planning Factor Activities

Instructions: Please review the definitions provided below. Considering your specific company, industry or area of service, drag and drop each activity from most significant to least significant based on the scene setter planning factors that were provided.

1. Political Activity (PA): Actions undertaken by members, affiliations, or parties vested with authority who possess a common set of interests, concerns, and goals.

2. Economic Activity (EA): The production, distribution, and consumption of goods and services to or for a given population

3. Social Activity (SA): Actions designed to better understand a society's culture and its norms

4. Infrastructure Activity (IA): Actions involving transportation, power generation, communications, banking, and health

5. Information Systems Activity (ISA): Efforts to collect, process, store, transmit, display, disseminate, and act on information.

6. Military Activity (MA): The use of State-sponsored armies, navies, or national militias possessing the capability to conduct both offensive and defensive operations.

Post Move 1 Survey for All Player Cells

Instructions: The purpose of this survey is to provide candid feedback regarding your personal insights regarding your group's discussions in the first move of this game. This information will be routed to the Data Collection and Analysis Team for use in post game analysis. Your responses will greatly assist the Chief of Naval Operations in his efforts to identify implications of future changes in global shipping patterns.

Demographics:

1. Player Name:
2. Company Name, Organization or Branch of Service:
3. Assigned Cell:

Note: Questions below are based on a Likert scale, which includes the following values:

Strongly Agree, Agree No Opinion or Don't Know, Disagree, Strongly Disagree

4. Based on my company, industry or area of service, I agree with my group's top three priorities.
5. Please provide any additional comments in the space below concerning question 4.
6. Based on our group discussion, we adequately identified the changes, implications and assumptions germane to the scene setter planning factors provided.
7. Please provide any additional comments in the space below concerning question 6.
8. Based on the scene setter planning factors and our group's discussion, continued non-ratification by the US of the United Nations Convention on the Law of the Sea (UNCLOS) would affect my business, industry or area of service.
9. Please provide any additional comments in the space below concerning question 8.
10. Based on your group's discussions, please share any additional insights regarding global shipping issues that you believe the Chief of Naval Operations should consider.

Definition of Jones Act: The Jones Act, also known as the Merchant Marine Act of 1920, requires that all goods transported by water between U.S. ports are to be carried by U.S.-flag vessels, constructed in the U.S., and crewed by U.S. citizens.

11. Based on this definition, the scene setter planning factors, and the subsequent discussion in my group, repeal or modification of the Jones Act would affect my business, industry or area of service.

12. Please provide any additional comments in the space below concerning question 11.
13. Given the scene setter planning factors, and subsequent discussion in my group, a substantial change in maritime related illicit activity (e.g., human trafficking, narco-trafficking, etc.) would affect my business, industry or area of service.
14. Please provide any additional comments in the space below concerning question 13.
15. Given the scene setter planning factors, and subsequent discussion in my group, a major unintended release of oil or a hazardous substance such as the Deepwater Horizon incident would affect my business, industry or area of service.
16. Please provide any additional comments in the space below concerning question 15.
17. Given the scene setter planning factors, and subsequent discussion in my group, exploitation of a major energy field in the region discussed in my cell would affect my business, industry or area of service.
18. Please provide any additional comments in the space below concerning question 17.
19. Given the scene setter planning factors, and subsequent discussion in my group, efforts on the part of a sovereign nation to unilaterally constrain flow of goods would affect my business, industry or area of service.
20. Please provide any additional comments in the space below concerning question 19.

Post Move 2 Survey for Panama Canal Groups "A & B"

Instructions: The purpose of this survey is to provide timely and candid feedback regarding your individual thoughts regarding your cell's actions in the final move of this game. This information will be evaluated in post-game analysis. Your responses will greatly assist the Chief of Naval Operations in his efforts to identify implications of future changes in global shipping patterns.

Demographics:

1. Player Name:
2. Company Name, Organization or Branch of Service:
3. Assigned Cell:

Note: Questions below are based on a Likert scale, which includes the following values:

Strongly Agree, Agree No Opinion or Don't Know, Disagree, Strongly Disagree

4. Inject #1: (Jones Act Modified) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

5. Please elaborate on what impact, if any, inject #1 would have on my business, industry, or area of service.

6. Inject #2: (Panama Instability) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

7. Please elaborate on what impact, if any, inject #2 would have on my business, industry, or area of service.

8. Inject #3:(Environmental disaster) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

9. Please elaborate on what impact, if any, inject #3 would have on my business, industry, or area of service.

10. Inject #4:("Carbon Tax") As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

11. Please elaborate on what impact, if any, inject #4 would have on my business, industry, or area of service.

12. Inject #5:(China Exports Decrease) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

13. Please elaborate on what impact, if any, inject #5 would have on my business, industry, or area of service.

14. Inject #6:(Terrorist attacks result in 100% Ship Inspection) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

15. Please elaborate on what impact, if any, inject #6 would have on my business, industry, or area of service.

16. Inject #7:(20% Loss of All West Coast Port operations) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

17. Please elaborate on what impact, if any, inject #7 would have on my business, industry, or area of service.

18. Inject #8:(Information systems deemed unreliable) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

19. Please elaborate on what impact, if any, inject #8 would have on my business, industry, or area of service.

20. Imagine that you have an opportunity to ride in an elevator with the Chief of Naval Operations. He recognizes you from your participation in the Global Shipping Game, and asks you: "What are the key takeaways you learned that I should be aware of?" Assuming your ride will be less than 30 seconds, please engage in a brief "stream of consciousness" response in the space below.

21. In responding to the question below, please consider your experiences over the past two days in their entirety. If you were to conduct a Google search on the key themes that emerged from the Global Shipping Game, what key words or phrases would you include in your search?

Post Move 2 Survey for Arctic Groups "C & D"

Instructions: The purpose of this survey is to provide timely and candid feedback regarding your individual thoughts regarding your cell's actions in the final move of this game. This information will be evaluated in post-game analysis. Your responses will greatly assist the Chief of Naval Operations in his efforts to identify implications of future changes in global shipping patterns.

Demographics:

1. Player Name:

2. Company Name, Organization or Branch of Service:

3. Assigned Cell:

Note: Questions below are based on a Likert scale, which includes the following values:

Strongly Agree, Agree No Opinion or Don't Know, Disagree, Strongly Disagree

4. Inject #1: (Energy Exploitation) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.

5. Please elaborate on what impact, if any, inject #1 would have on my business, industry, or area of service.
6. Inject #2:(Fisheries) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.
7. Please elaborate on what impact, if any, inject #2 would have on my business, industry, or area of service.
8. Inject #3:(Protectionism/Commercialism) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.
9. Please elaborate on what impact, if any, inject #3 would have on my business, industry, or area of service.
10. Inject #4:(Choke Point/SLOC impediment) As presented to my group and through our subsequent discussion, this inject would significantly change my business, industry, or area of service.
11. Please elaborate on what impact, if any, inject #4 would have on my business, industry, or area of service.
12. Imagine that you have an opportunity to ride in an elevator with the Chief of Naval Operations. He recognizes you from your participation in the Global Shipping Game, and asks you, "what are the key takeaways you learned that I should be aware of?" Assuming your ride will be less than 30 seconds, please engage in a brief "stream of consciousness" response in the space below.
13. In responding to the question below, please consider your experiences over the past two days in their entirety. If you were to conduct a Google search on the key themes that emerged from the Global Shipping Game, what key words or phrases would you include in your search?